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Acc. 282 931

1934

April 1969.

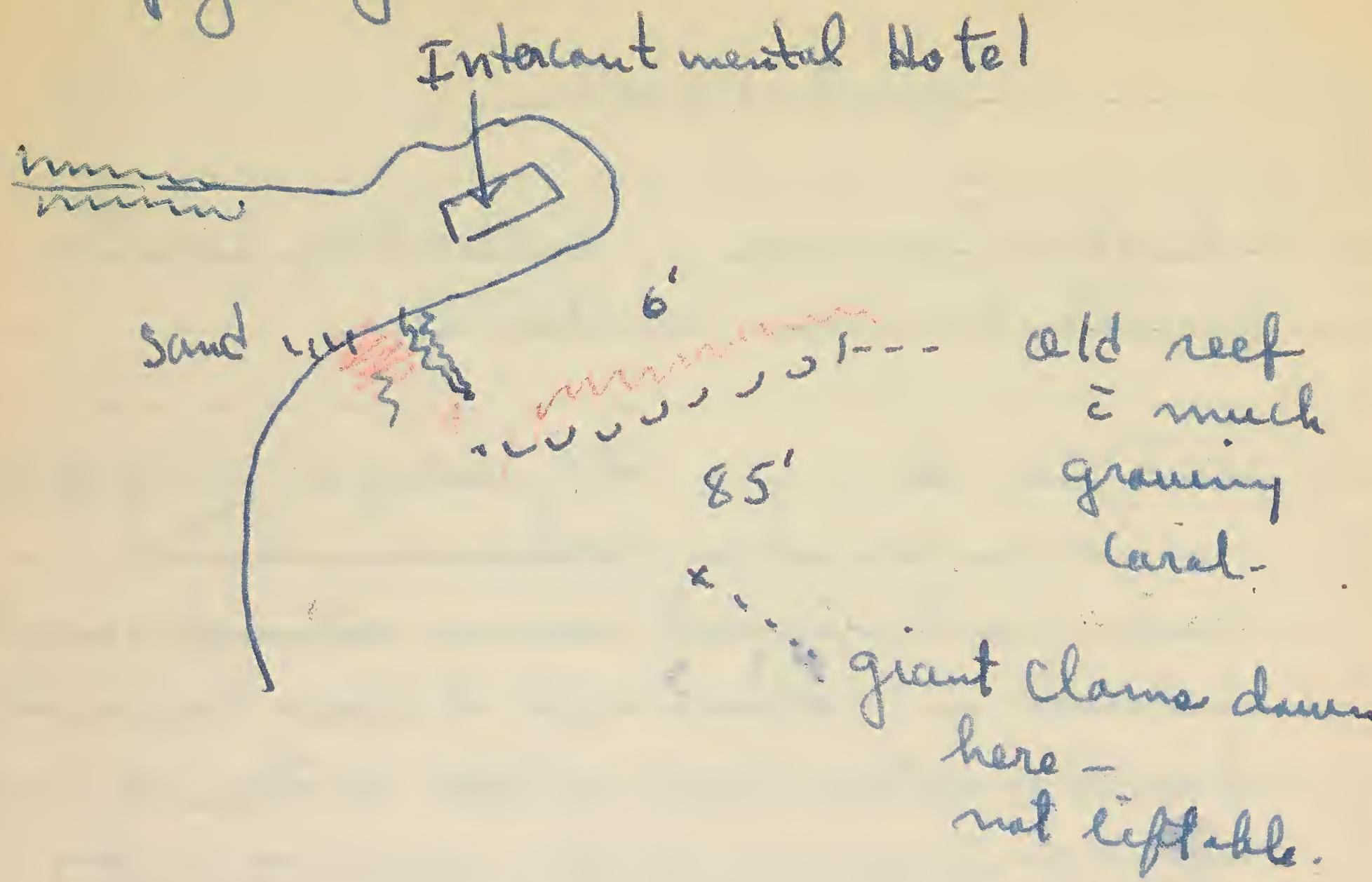
Tutuila Samoa - collecting for the
Smithsonian Institute.

Station I . . The bay of Pago Pago
is in a sunken volcanic crater
and on the west shore stands Goat
island - There are heavy lava stone
breakwaters here with a sandy beach
which was probably manufactured -
First collection consisted of many
small shore shells - small moon
shells - clams - strambus - couris -
These were picked up - on
April 20 - 21 - 1969 -

29 April - Snorkeling - 1 hr - some
dead specimen observed - 2 + 3 1/2 cm
couris and 6 cm orange + black cone -
taken.

7 May Snorkeling - 1 hr - several
small ring couris taken at 6' - one
cone - several large old cones
inhabited by crabs.

Pago bay -



The bay to north of intercontinental hotel is being dredged - on May 2 this was searched - Low tide -

A number of old shells found - many Isabella Conus - Conus ~~Geographes~~^{striatus} etc but no living material -

Water in the bay area is turbid & even over the edge of the reef it is turbid with micro organisms -

The reef area has been snarkeled repeatedly - again on 31 July - the following found in 1 hr - *C. erosa* - (10) - *C. isabellae* - *C. Ariaca* (2) - *Conus striatus*, *Conus testis* - , *Conus episcopus* - *C. lividus* *C. varius* - One Olive (empty) - Tide was out & these were found in 3' water just inside the reef - none preserved -

II

Station 2 -

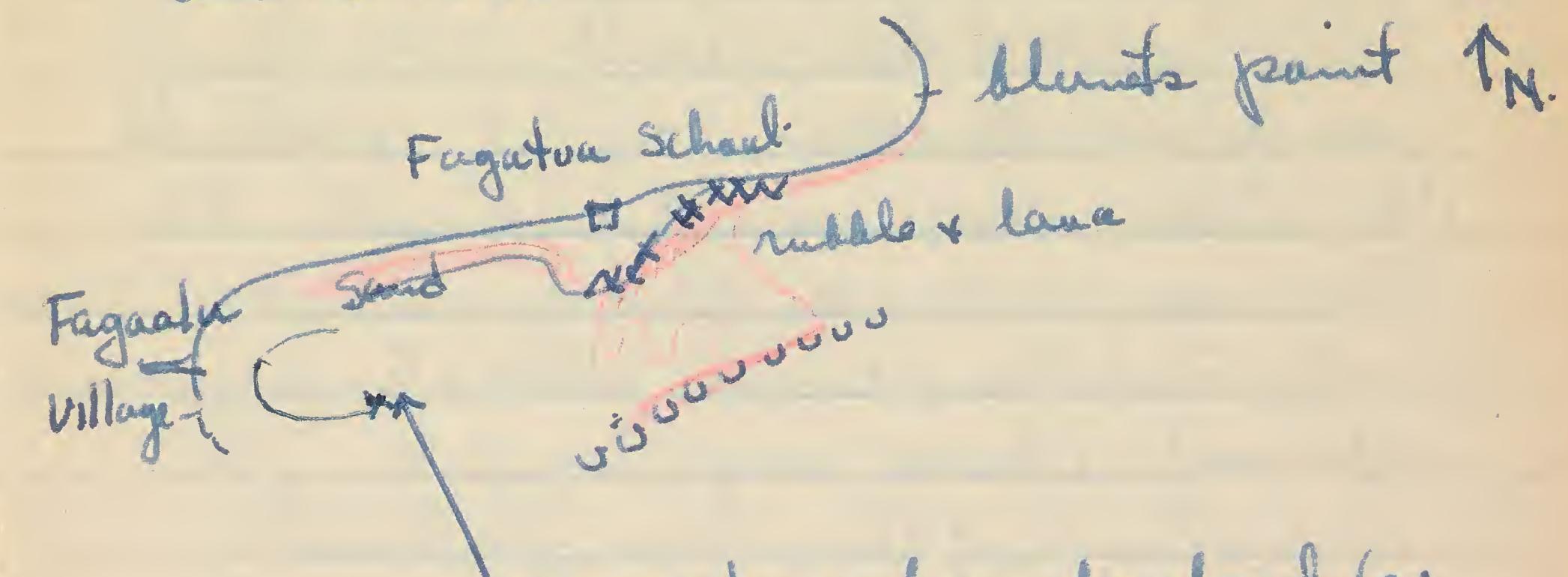
Tutuila Island - This is a shore behind an off shore reef at the entrance of Pago Pago harbor - The land runs NE to SW - bank is lava rock - with some sand beach but also served as a dump probably by Navy many years ago - there are old rusty engines etc - now called Fagatua school area - (Faga abu -

About 100 yds off shore is a reef of coral breakdown with very little living coral - At low tide .6" above mean low this was inspected on 26 April - Some rocks were above water but there was considerable current and the area seemed rather sterile - no specimens recovered in one hour search -

The area between the rocks + shore had coral breakdown bottom with rather a swift current to the SW - Some small nerites found.

The shore area was collected on 22 thru 26 April at high and low tide - 18" difference - and

16 specimen jars filled with nerites and various mollusks abundant enough so that 6 - to 20 of each could be collected with ease -



area has been dredged for road material - This area is almost devoid of mollusk remains and no specimen found -

—
2 May 69 - 1½ hr search - low tide - One Canis *Cayetserpentis* - found - "Young Samoa had & arabian (*C. arabica*) he had found = many small bivalves + gastropods found under coral - in 12" of water - Small quantity also found under shore rocks - Low tide -

15 July - The entire family spent 1½ hrs here - finding the usual reef shells - The sandy shore reveals small bivalves and occasionally other

III

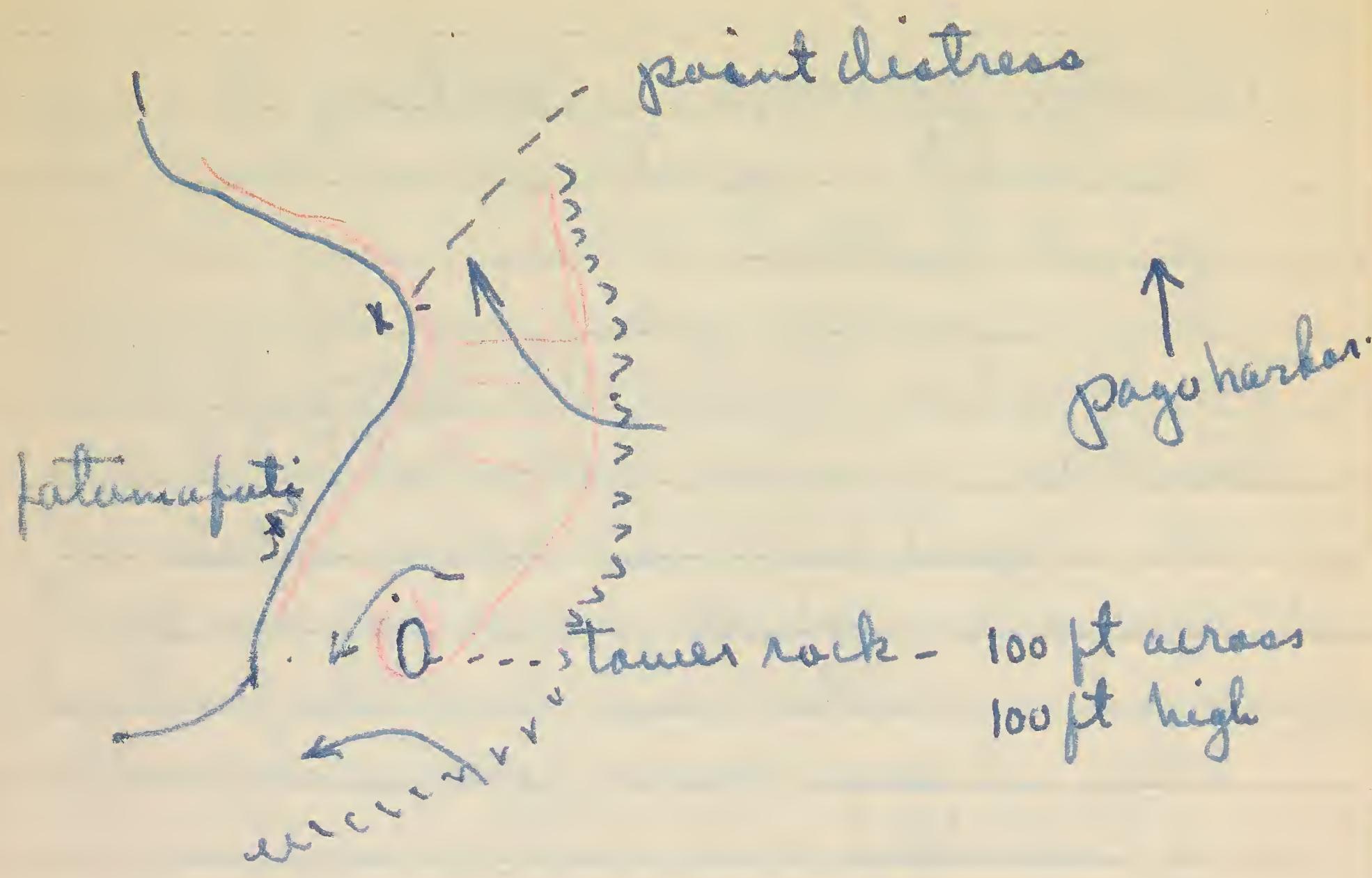
things - a good shore shell identified as
Conus querina

19 Aug - On numerous occasions we
have walked this beach, not finding
much - On this day at mid tide
the area was snorkeled for 1½ hrs.
There was a sandy plateau in which there
were *Terebra*, *Conus litteratus* & *querina*
Rimna, none very frequent - An
assortment of these was gathered &
preserved in alcohol -

Tutuila Samoa - Station 3 -
Collected - April - 69.
Point distress area -

The shore is lined with heavy lava
boulders - This was collected on
24 April - and some nite time
specimens found however on 26th
April - nite time low tide collection
trip of one hour produced nothing
of interest -

Off shore for 200 yds to reef edge is
coral break down with rough solid
coral washed by a strong current
This is estimated at 4-5 knots
at low tide with a moderate to low
surf - very little living coral -
very few holothurians or other forms
of marine life seen - Numerous
nerites and tidal species on the lava
rocks in same distribution as in
station 2 - not collected -



IV.

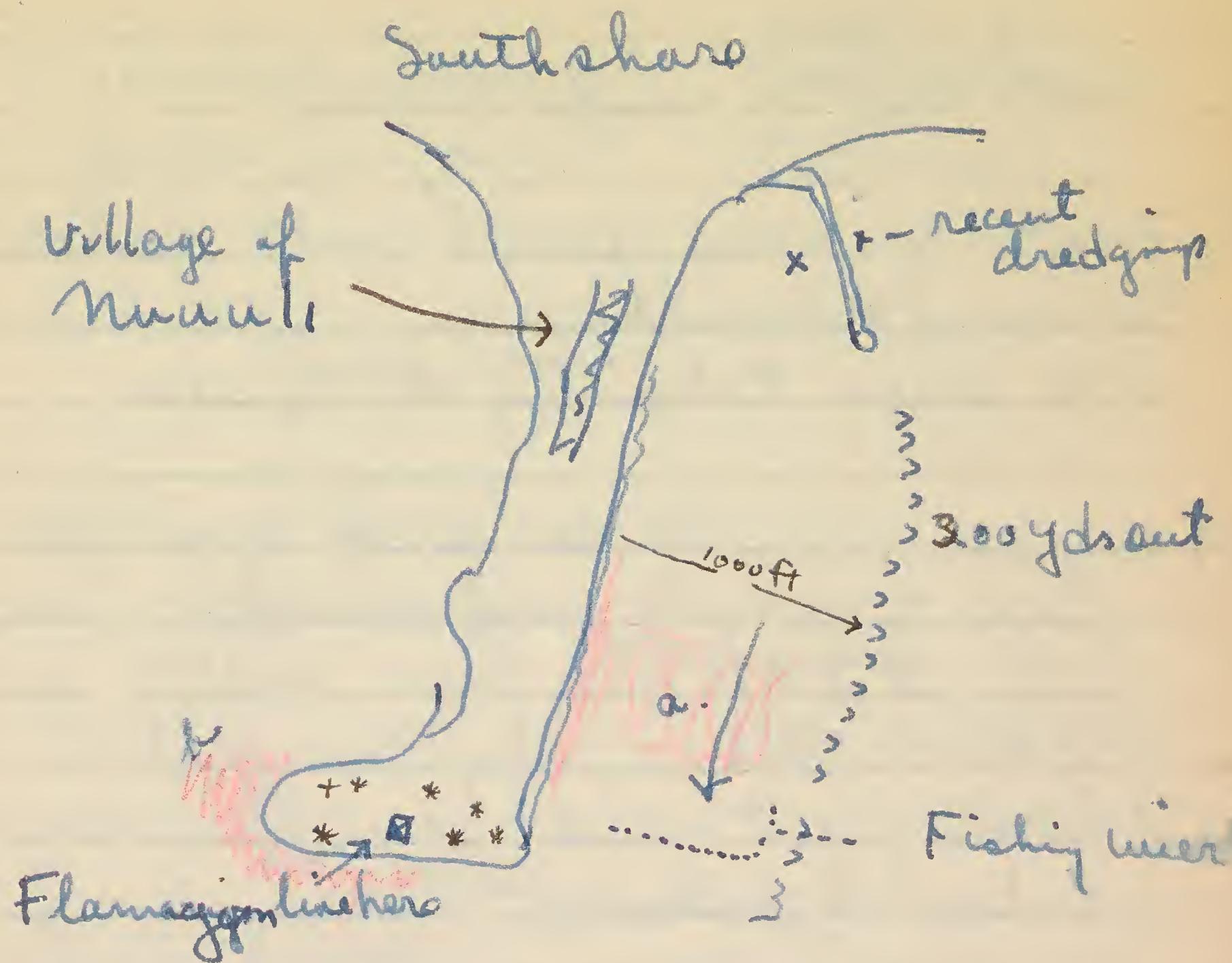
Tutuila - Samoa - Station 4.

Colomut

Bassama point - This is a spit of land projecting almost a mile south from the land - It is narrow and low built entirely on coral - The area collected was on the east side of the tip of this peninsula -

There was a wide sandy beach almost devoid of shells - The coral was - living in part but most of the bottom was crumbly brown leafy structures the true nature of which

red coral + I didn't know - There were many holothurians of several varieties some being 4' long, there were large blue star fish with a moderate number of mollusks - but almost as many bottles - beer cans - Old shoes There were occasional sandy patches



Collected 24 Apr. 69 - low tide - 6 to 8 PM.

There were many Bulla amphora - Limpie - mostly with hermit crabs - One Tun collected - many sea urchins -

13 May 69 - 12:30 - 2³⁰ PM - low tide at 11³⁰ Area I west is flat sandy beach in 6-12" water - Still a heavy wind made ripples obscuring trails + made water turbid - Many small strandidae found + collected - marked IV b. By time the "a" area was reached the

water was too rough turbid -

12 July 69 This area visited with Dr Harald Rehder of the Smithsonian - Specimens in both areas taken by Dr Rehder -

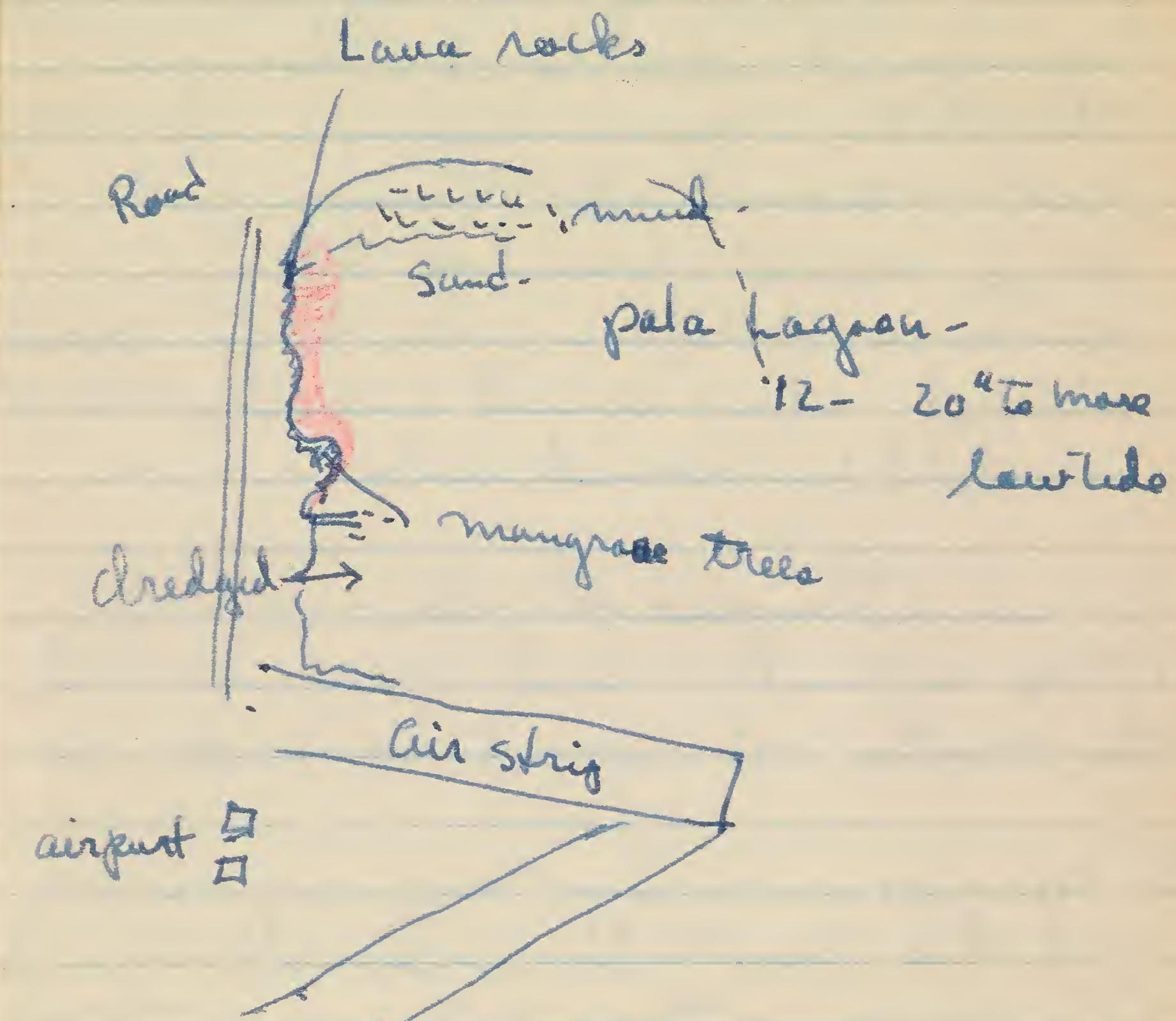
19 Aug. 69 - Again the surf was too high to permit reef work - low tide at 5 AM - Area reached just prior to that, sky clear but a strong east wind prevented seeing below 8 miles - Specimens of Cypraea - Conus - terebra - Turban nerita - Palines - etc preserved -

Red coral

Lurek

T

Tutuila - Samoa. ^{west}
Pata lagoon - ^{East side} Tafuna.



25th April - This is a sandy bottom 18" deep a low tide - shore has lava rocks - mangrove -- upper end of the lagoon is mud - many patches of green algae but repeated search revealed no shell or molluscs attached - usual assortment of black nerites on the rocks -

There were occasional tellin shells
and an occasional Cockle on the
beach -- There were several old
tires + pieces of heavy mechanized
equipment abandoned + dumped in
the water - years before - Saw one
eel - one small moray but
sand seemed devoid of trails - or
evidence of life - $\frac{1}{2}$ beach search
showed a few small ancient gastrapods
inhabited by hermit crabs -

Search attempted at nite - low tide -
little activity - but rain clouded
the water so search abandoned

10 May 69 - Early morning search
at 8.1 low tide was no more
impressive than before - 2 hrs
search produced nothing not
found before -

July - Searched again - nite - low tide -
only a few nectines encountered -

VI.

Tutuila Samoa-

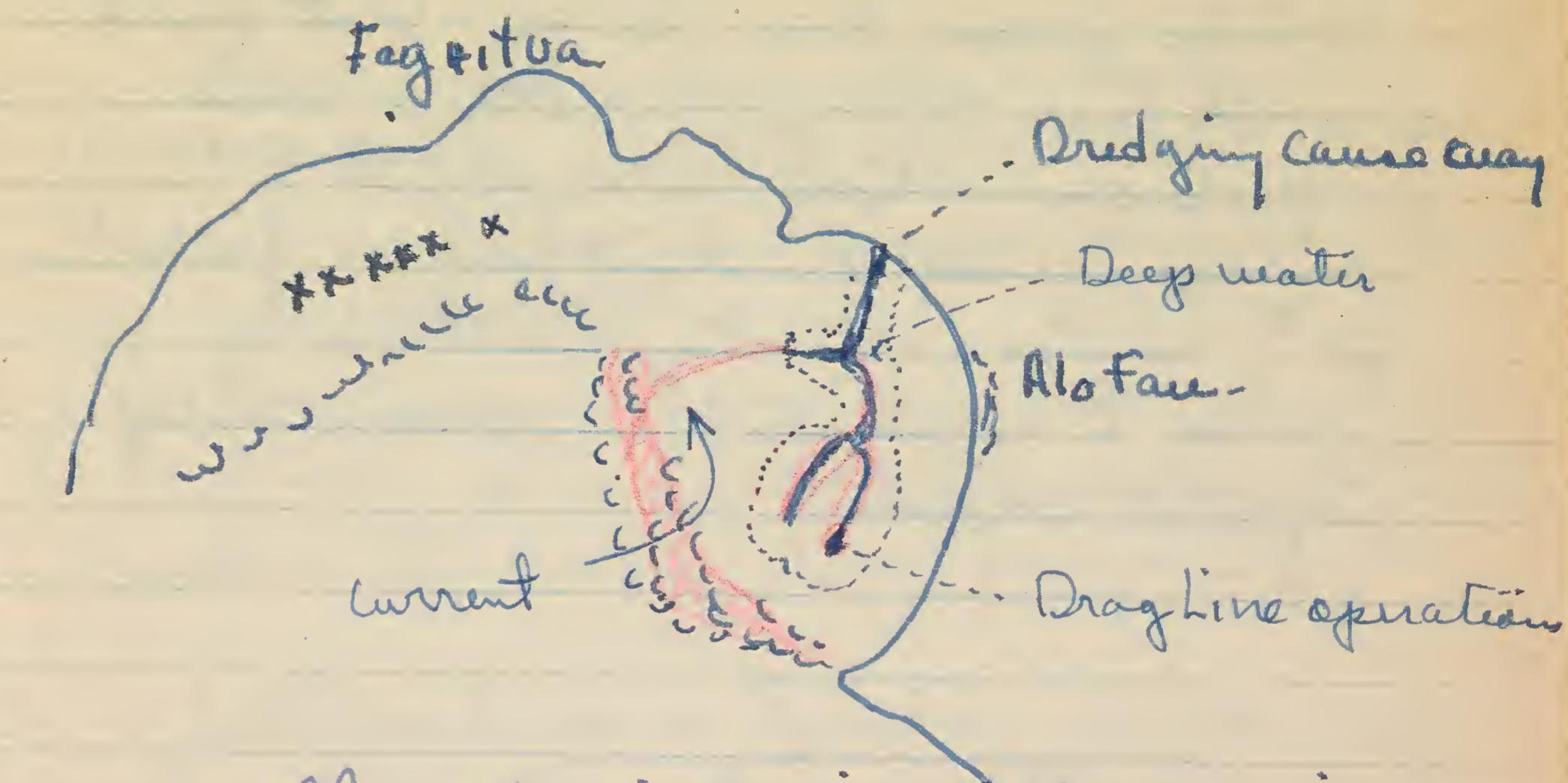
East side Fagatua bay,

Apr. 69

This is a bay 1½ wide 1 mi depth
Coral reefs lining the shore - A
certain amount of dredging has gone
on here, for possibly 10 years.
The coral rock roadway constructed
out into the bay is now ¼ mi long and
100 ft wide - On either side are deep
channels - possibly 15' deep where
road way fill has been removed. These
are not over 50 ft wide inasmuch
as the drag crane can't reach farther.
There are many shell fragments and
shells dredged up - As far as I can
ascertain most of these were dead
and had been mashed in the hole.
There was no evidence of living
mollusks on the edge of this road way.

On 28 April this was collected
twice - For 3 hrs at low morning
tide - lowest at 9:30^{AM} and for one
hour at rite - low tide.

4-10 PM -



very old reef with minimal growing
coral - Many small corals.
Cypraea moneta and a lot of hermit
crabs in tiny shells. Fragment of
giant clams on the debris piles -

19 July 69 - Another shore search revealed
many tapestry shells - prob. Turbo Reeui,
and Cypraea Vanelli - Some teredoa +
bivalves however the only shell picked up
thought to be unusual was a Rhombicunus
imperialis -

24 Aug 69. A group of us went snorkeling
where the group of Xi are - near

VII

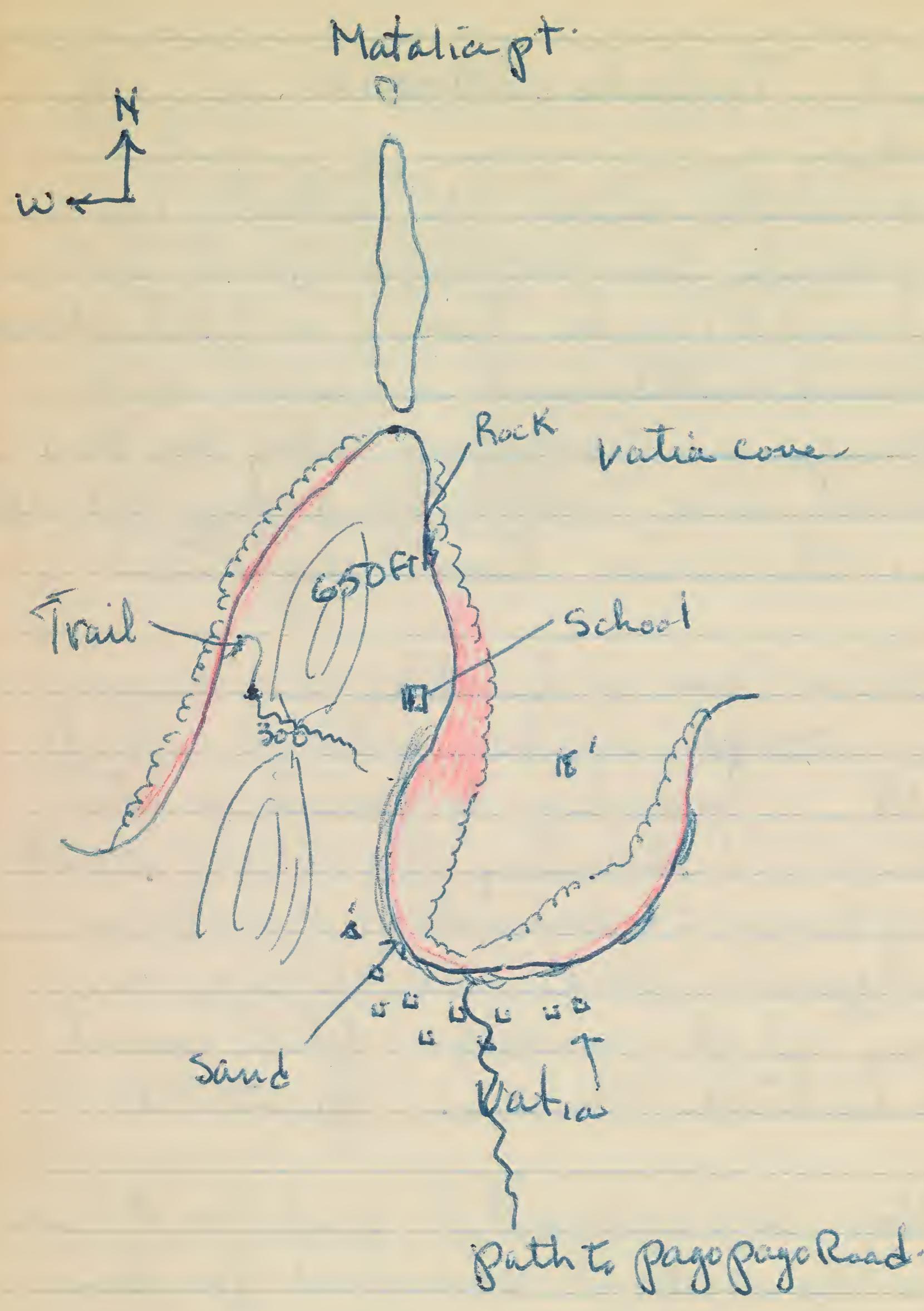
Fagatua. Results were not spectacular
aside from one large flat couch
with an orange mouth - This
specimen which was about 8"
across was unidentified - found in
10' water - sandy bottom by
John Flanagan - preserved by
injected alcohol -

Vatia - Tutuila Samoa

The north shore of Tutuila is
inhospitable for the most part but
there are 5 or 6 coves where there
are small settlements - Vatia is
1 1/2 mi from Pago Pago bay by air
but there is a 1000 ft ridge which
makes the area less frequented -

Vatia Cove is lined by a growing
reef - 100yds wide - then a drop
to 18 ft - fed by 3 fresh water
streams - sandy beaches + coral
breakdown + smaller rocks on
the edge - near the shore are
many flat rocks + flat coral
under which there is protection -

This was visited and the area
near the school searched for one
hr - low tide - 11 AM -
water extremely clear - a few
live specimens taken and placed
in alcohol - 1 May 69



The area was visited from May 5 to May 8 when I stayed with the school principal Donald Daugless -

The area near the school was searched 3 times at low tides -- no ~~water~~ lantern available for night search - There were multiple small cyprae + Olivides - with the usual drupa + nerite collection in the rocks however they were scarce except at the area marked rock -

The east edge of the cove was rocky and little unusual recovered - near the school one heavy shell-eroded + spiraled much like a volute - was seen - 6" long - very old + too heavy to trail pack -

An excursion to the west side of the ridge was made on 6 May 69 - 4-45 PM - low tide 1721 - 0.0 - There were remnants of Canidae + Cypraea in the rocks - The bank was composed of boulders - were very abrupt. There was a growing reef - the edge being 150 ft or less from high water line - Surf was heavy + there was no loose coral or rock to afford protection + most

VIII

specimens were beach shells - One humped back Courier; *Peribulus mauritiana calcequina* was found by a Samoan fisherman.

During the entire week winds were strong & constant - Waves were high & surf constant -

Area 8

Leone Bay - Tutuila Samoa

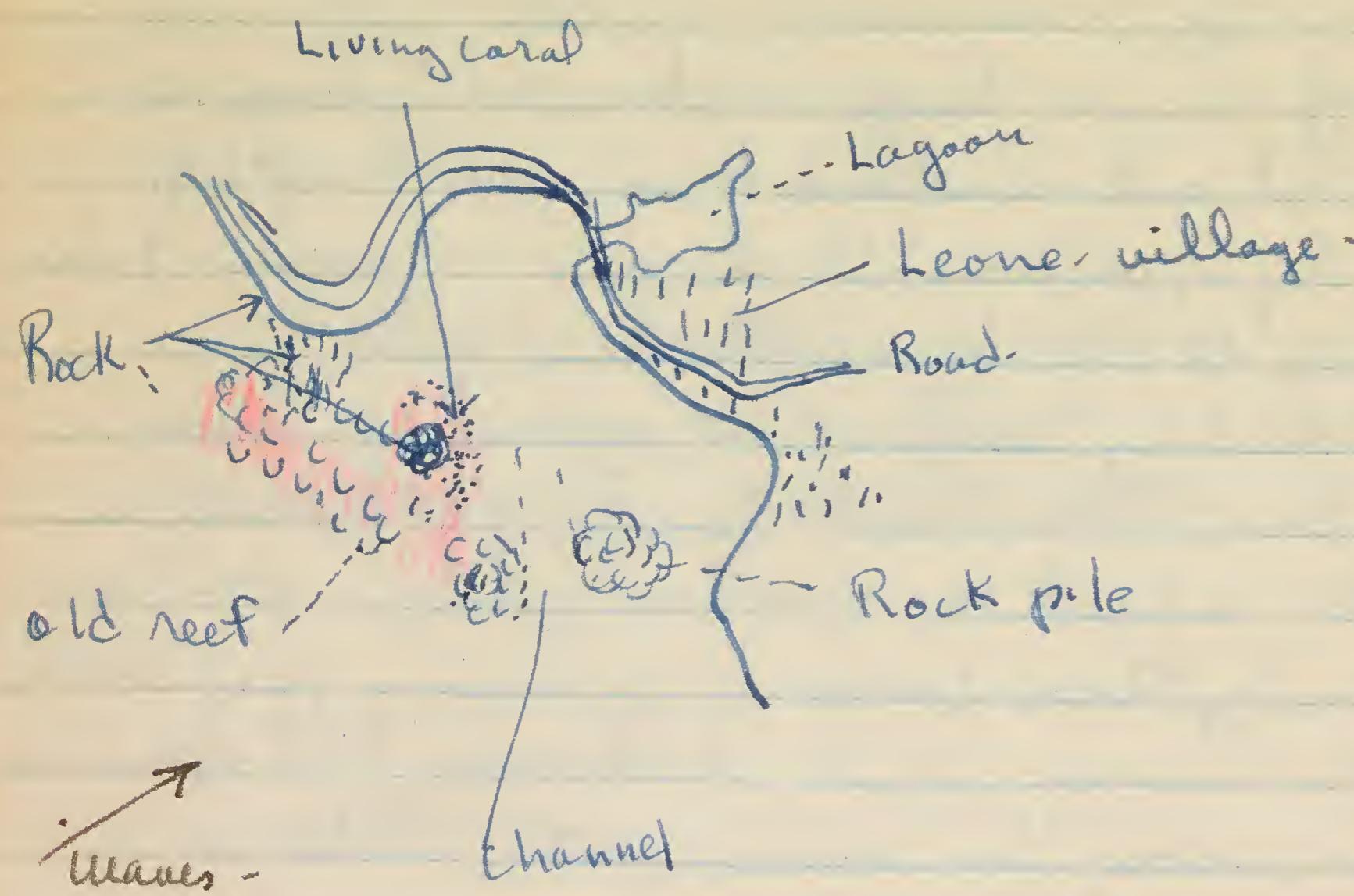
surf was high when this bay was visited and collected on 12 May 69. - Cloudy - intermittent rain - from $\frac{1}{2}$ hr before to $1\frac{1}{2}$ hrs after low tide -

The bay reef is composed of lava rocks with dead coral plates & other rocks about a central pile - In the vicinity there was a growing reef with much living coral however all specimens taken were in areas with little or no living coral.

There were very numerous golden ringed Couriers - Another collector from Leone found a reticulated Arabian Courier and 2 Geographic cones with the use of a glass bottom bucket in deeper water -

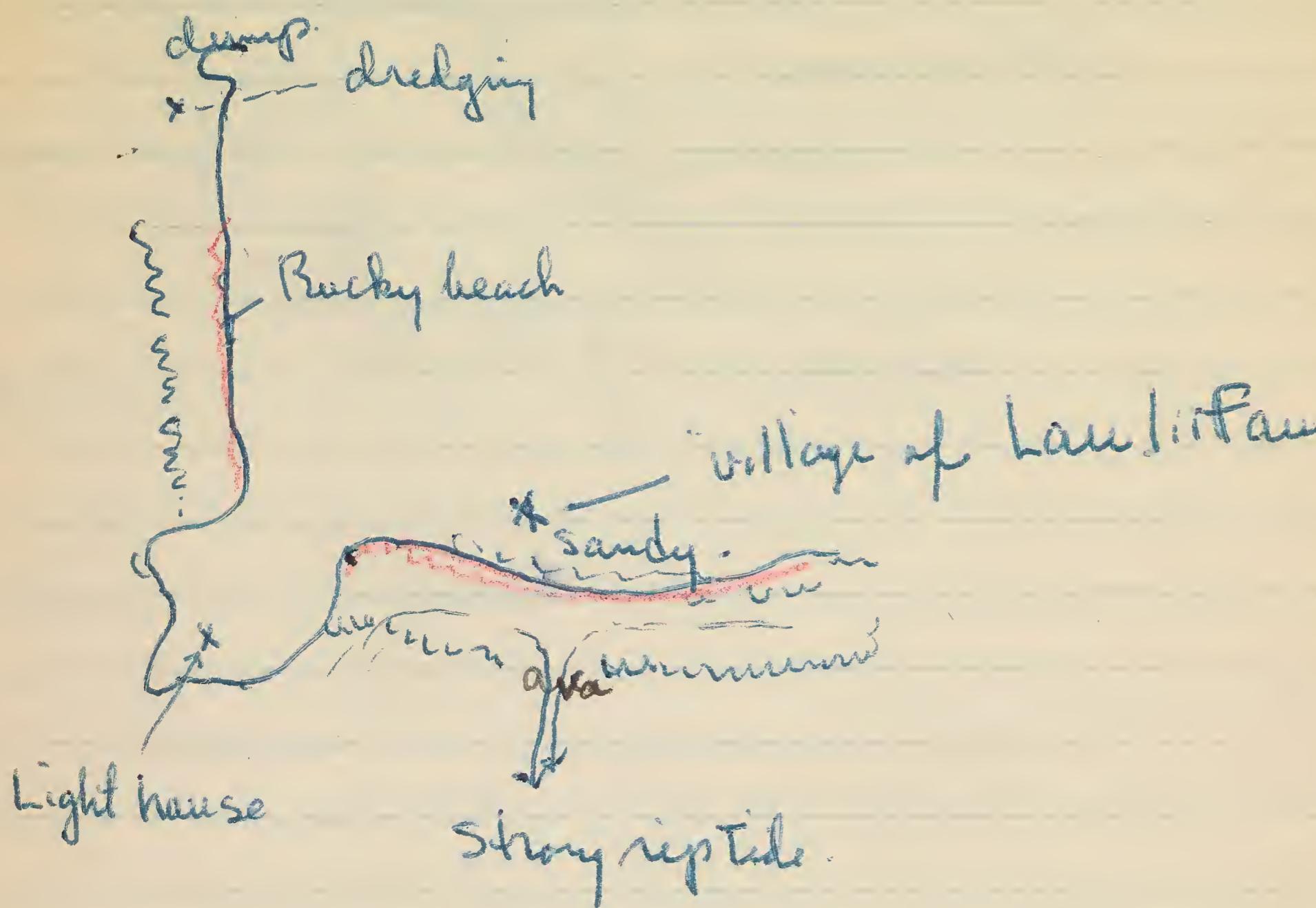
Specimens preserved were hairy Tritons - and assorted others with an occasional Courier -

(eas)



Tutuila - Samoa - Area 9

About Breakers point - 10-11 May.



May 10 - preliminary beach survey
of this area done with beach
shells collected - water was very
rough + too high to enter even at
mid tide -

Later attempts at site search failed
because of a burned out light just as
search began -

Area 10 Fagasa

Tutuila Samoa

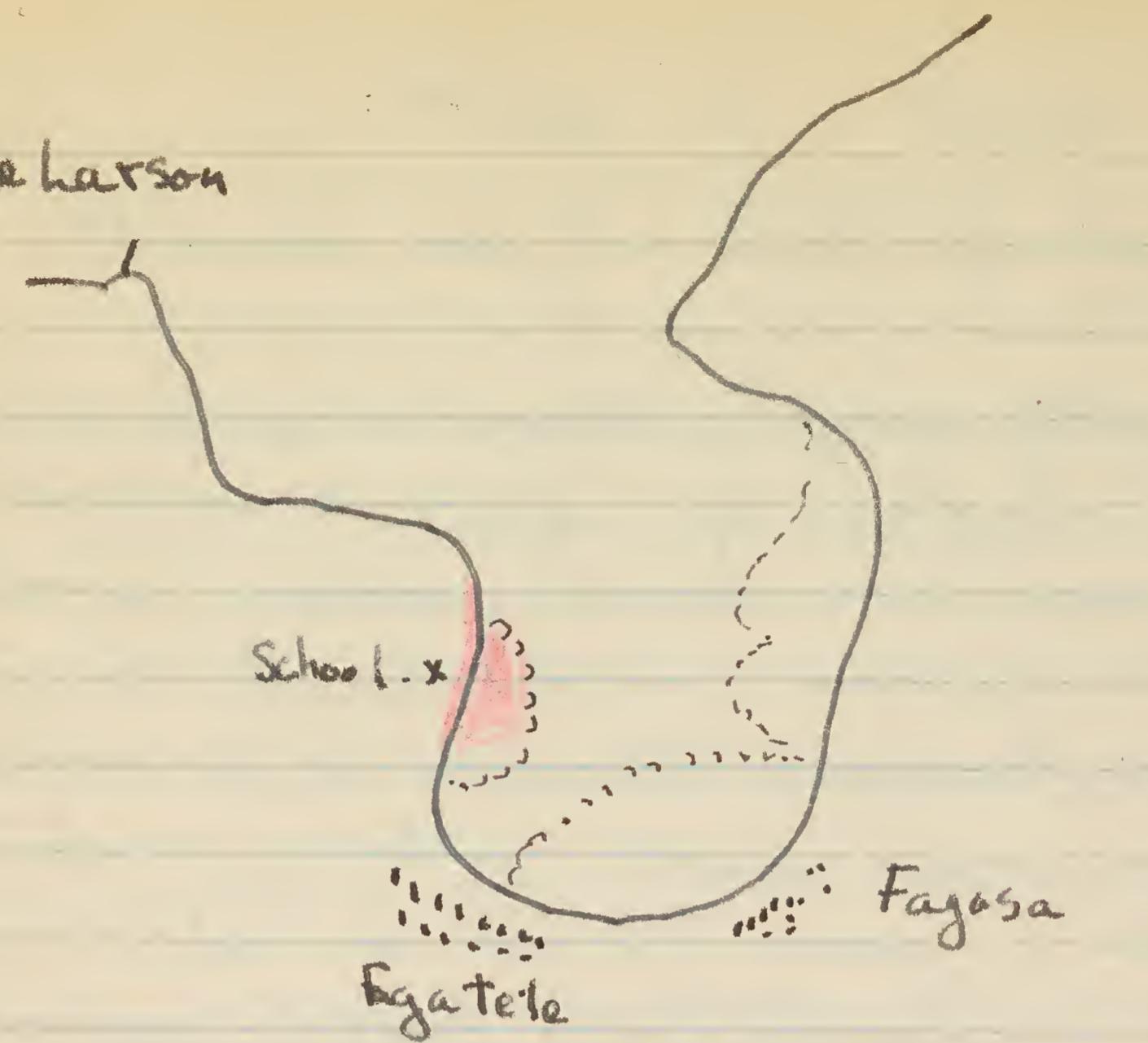
This is a north shore bay which can be reached by road - and has been occupied for hundreds of years -

There is some sand but mostly a fairly narrow reef - with little new coral - little coral breakdown but some lava boulders at the edges - Only the western portion of the reef was searched - at low tide - noon

14 May - Little evidence of shell fragment on the shore -

After 1 hr search discontinued - high water - wind & rain -

Cape Hanson



14 July - Same area - searched - by 4 collectors at low tide - one with snorkel - The shore area showed many drupa, most common mollusc was *C. caputserpentis* and some of the smaller cones - 3 sets of specimens preserved in alcohol - 2 hr search.

Contacted the principal - Miss Emery Dunn at the school in Fagatele - She had a box of shells her children had picked up. This included *Potamidesma* - *Pissidies* - *marasoma*, *Staphylaea* *nudus*, *Pustularia exocula* - and an assortment of the usual Arabian - snakes head etc

Area 11 area.

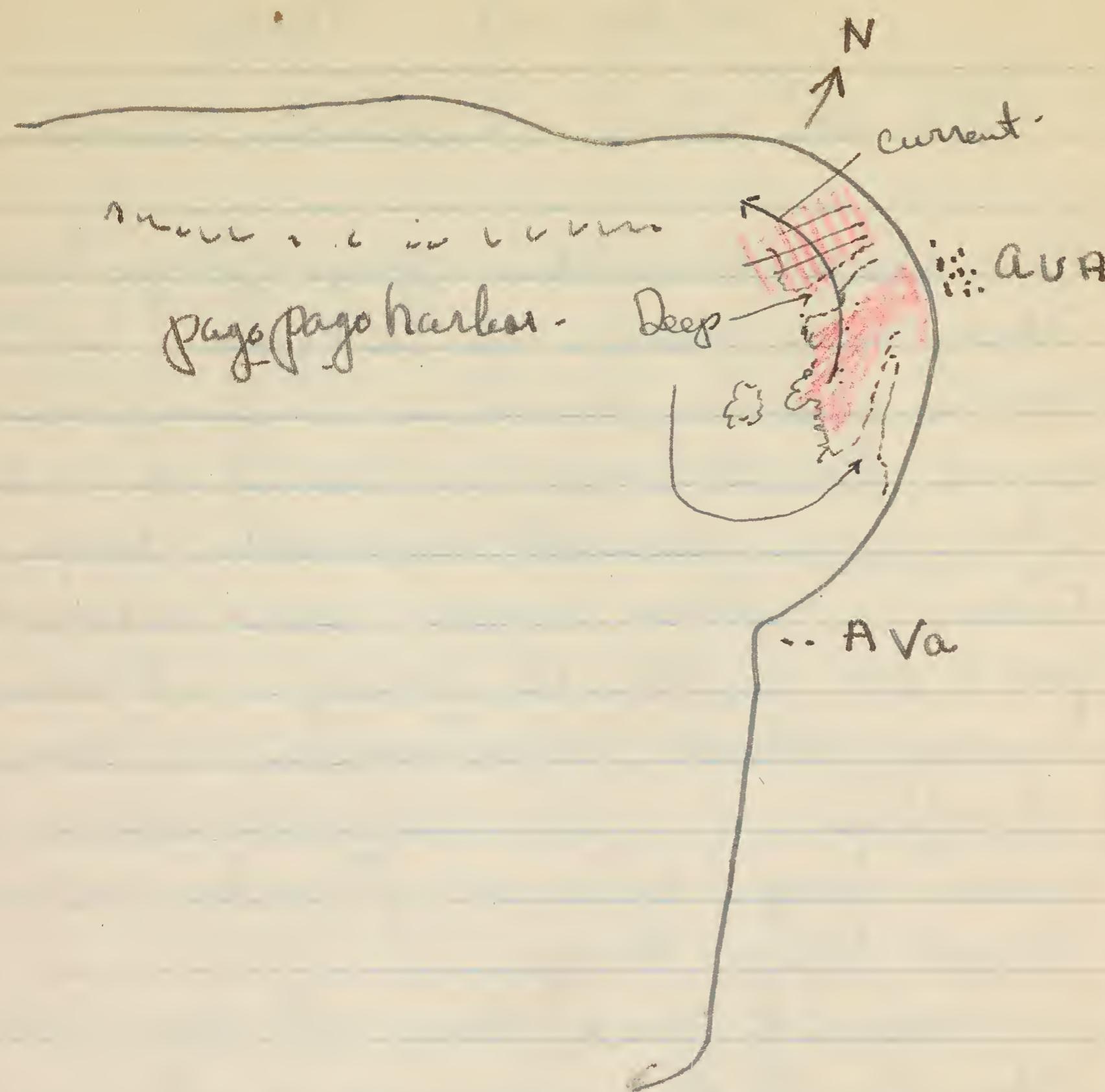
(Ah-oo'ah.) - Tutuila Samoa -

This area is within Pago-Pago harbor.
There is a reef - of 200yds - with
some growing coral -- a few patches of
coral break down -- some sand -
There is a swift current even at low
tide - This area - was searched
for 1 hr on the 15 May - There were
many black holothurians - Some blue
starfish - In several areas there
were deep holes or trenches which may
have been dug -

Search was done at low tide -
The one trillie was given to me by
a Samoan who was digging them near
the beach and around toward Leasi
Point - nothing unusual was found.
but the normal quota of small curies,
rock shells - etc -

~~22~~ July - May - A nite search was
begun here but terminated abruptly
when my light went out -

June



30 July 69. The sandy area - north of deep - marked with cross hatch was explored - 10 *Erosa* - 2 *C. maulifera* - several small strawberries - two *Terebra maculata* - A *Conus virgo* found - None preserved in alcohol.

4 Aug 69 Nite low tide search - wind of 15-20 knots obscured everything -

Western Samoa -

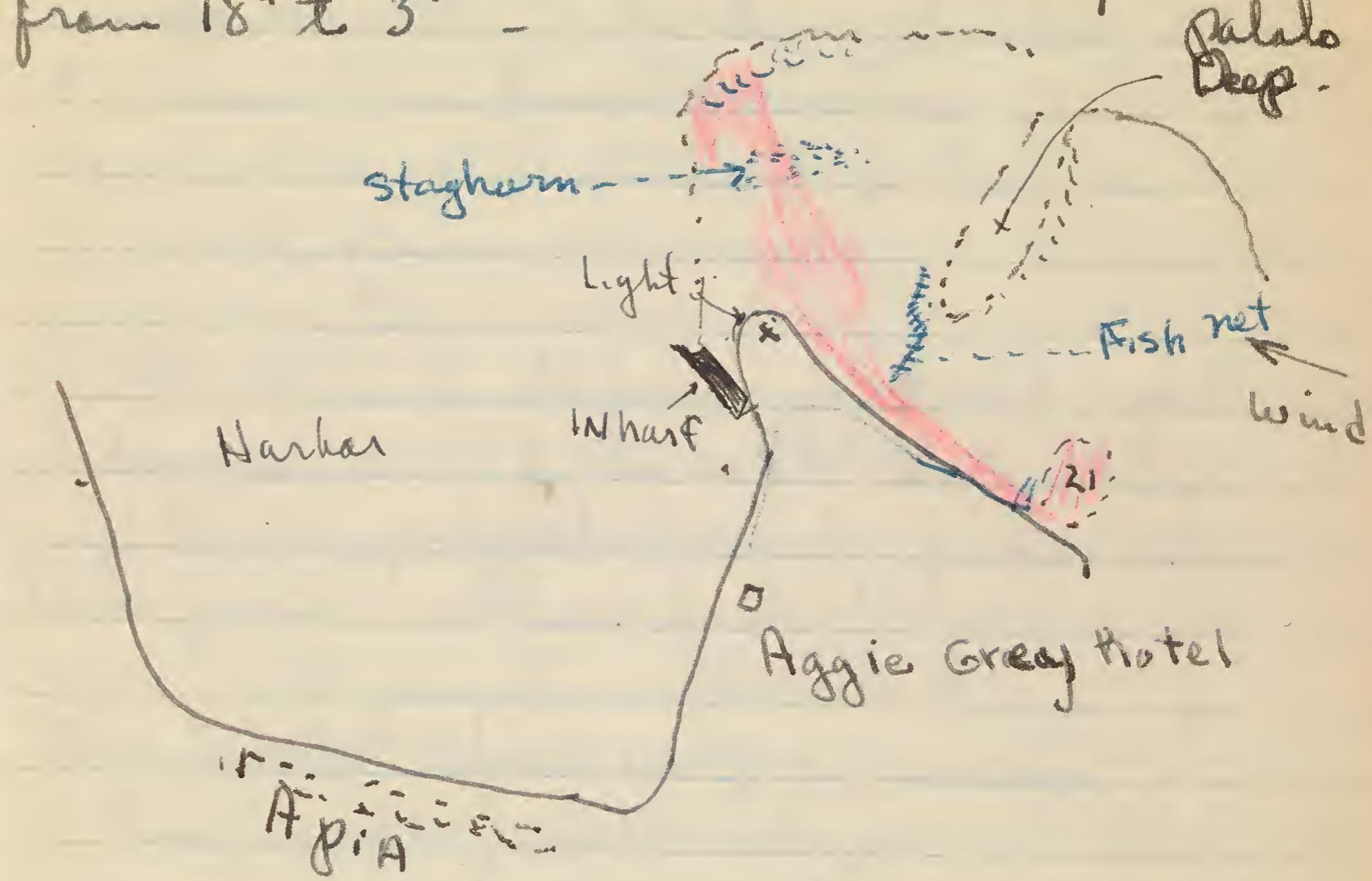
May 69.

Area 12.

The Apia harbor has been dredged and is filthy - The beaches are dark brown sand, partly contamination, part from the lava content + from the effluent of a river that is brown and murky.

I saw no rock shells (nudibranchs) along the rocks in the inner harbor - The first collecting area is labeled # 12 and consists of the original Coral head stretching 300 yds out - The shore line is dark sand - The first 100 ft the bottom is slippery brown ooze and beyond this far 600 ft is coral breakdown - The bottom consists of a thick layer of Calcareous sediment - no sand - In this area were occasional heads of growing solid coral - Beyond this were many areas of stag horn coral all blue tipped - to the end of the reef where the bottom was solid coral breakdown - Water temp was about 80° - very little current from the moderate surf but some current

generated from the Eastern Trades which blow almost constantly + give enough waves to be troublesome - The tip of the reef is exposed at low tide however at low tide the area is usually covered from 18" to 3' -



First collecting on 19 May was done North from the light in coral breakdown area. These live specimens were preserved in ethyl alcohol - no shore specimens taken - low tide -

9 AM

20 May - Using snorkeling equipment
the inner basin was searched for
2 hrs - at high tide - If there were
trails they had already been obliterated.
Fanning raised such a cloud of debris
as to be impractical - Several specimens
of cones were obtained -

Labeled as to date -

20 May. Breaking search 3:30 to 5:30
with low tide at 4:30 - Search to
the surf line skipping most of
the intermediate area - Large chunks
of coral turned -

Specimens preserved & labeled as to
date - Water was clear but
running with the wind -

A shore search was then made
and this was assisted by Samoan
youths who lived on this beach -
All shore shells & dead shells found
were put together & dated -

21 May.

In the Area labeled 21 there was
a patch of sea plant which reached 16"
at mid tide to float on the surface - The
small leathery leaves were olive-gray
& color - many attached to chunk of coral -
much broken calcareous debris & mud
however this gave protection so the water
was calm & undisturbed surface seen -
a single pina discovered - A Samoan
gave me their name for it & said it was
good eating - a few small straminidae
were found - Then a patch of 100 yds of
growing coral however no single specimen
was found either under boulders - or in
among the coral - The search was
terminated by a shore search almost
to the light - 2 clinton found in the first
mentioned plants - Many very weathered
cones & corals seen - too moss covered &
eroded for identification so not collected -

27 May - 2 hrs at low tide - the extreme
edge of the reef - Collected - Two green
turbans seen - not taken - a ribbed
coral - a textile cone and a few

small shells found - There is exposed growing coral but no loose coral plates + no evidence of molluscs and on most of the edge of the reef - The inner portion of the reef contains only coral breakdown + no molluscs seen - even crabbbed ones -

4 June 68 - A party of 3 snorkeled the Palolo deep area for 1 $\frac{1}{2}$ hrs at high tide - which was at 10.14 AM. The area of 100 yds to the deep contained coral litter with occasional new coral growths - Calcareous debris but no sand. There were star fish - sea urchins, Holothurians but none abundant - In the deep slope was stag horn coral and other forms - Visibility was perhaps 75' with much suspended matter in the water. Many fish seen but no molluscs were found or collected which had not been previously seen here + collected. There was a sloping plateau of perhaps 30' which gradually deepened toward the area where the deep penetrated the reef -

Area 13 - Upolu Island.

Mata'utu, Lefaga Bay area.

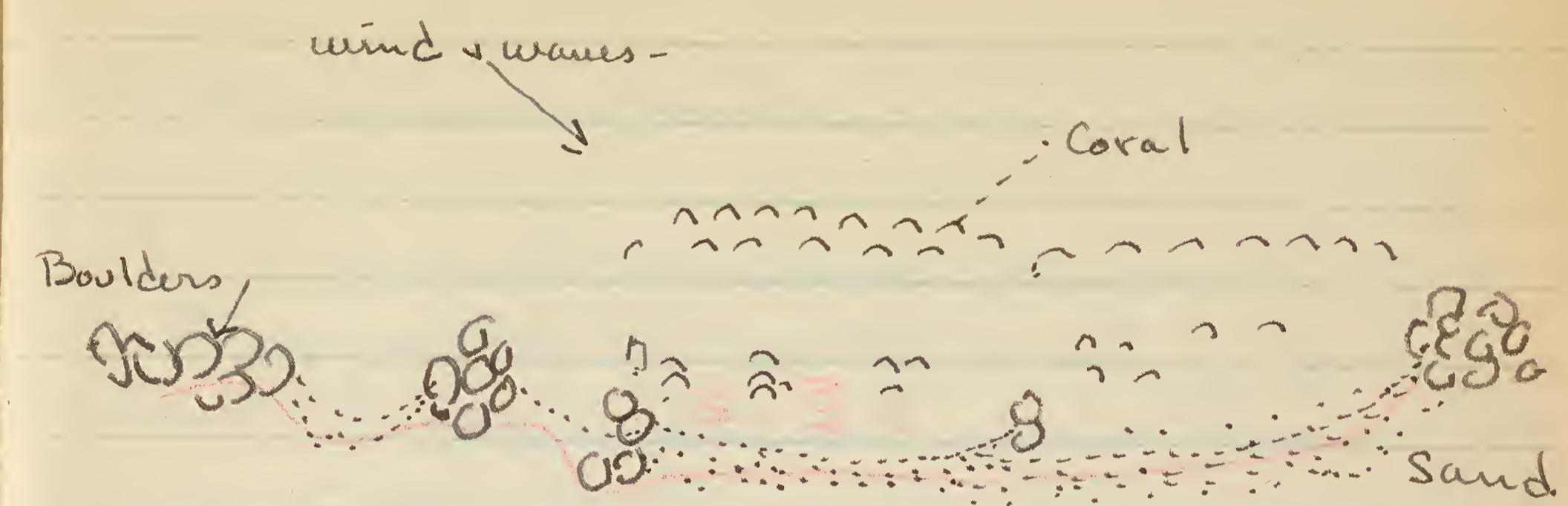
South coast of Upolu is less inhabited than the north coast - The reefs are not as broad - The sand is white.

Mata'utu is a village about a mile from the search area which actually has no name - It was a 1000 ft stretch of beach with patches of sand and large stretches of black lava rock on which the surf beat heavily -

The Ocean floor at the sandy area deepened sharply and at 20 ft was 6' and at 400 ft was 10-12 ft with several large coral heads -- farther out perhaps 300 ft. Waves were breaking on a reef -- Most collecting was confined to shore search - Snorkeling was attempted but the current, + high waves made this impractical - a bottom search showed a Hebrew cone, chryse shells, tridacna etc however no living molluscs were seen

Some live specimens collected from tide pools + rocks. labeled # Area 13.

Date 21 May 69. - Time 1 hr



Area 14. Upolu Island
Samoa -

③

Mulinu-u Point

There is a long sand peninsula jutting out of the north coast of Upolu about $\frac{1}{4}$ mi wide and more than a mile long - This is shown on large maps and is at the entrance of Apia harbor and marks the western end - To the east is a mangrove swamp - On the peninsula are graves of several high Chiefs - the Parliament house (Fono) - radio station - and the meteorological Observatory at the tip - Mr Philip Mueller the director knows the reefs and put me in touch with a Samoan Fisherman Mr Edward Williams - of Indian Samoan descent raised & educated in Fiji - He lent us his 2 man PauPau outrigger-

First search was on 23 May 69 - from 6 AM to 10¹⁵ AM - Low tide at 7:18 AM.

Surrounding the end of the peninsula is rather dark brown sand with numerous shell fragments - small - Strombidae, Clams, etc - This drops

off rapidly to deep water - 8'-10' deep which possibly was the result of dredging - I couldn't confirm this - About 200 ft out water is 30" at low tide - bottom is sandy with occasionally some small plants and a small bit of coral - or sponges -

Going N.E - at 500 yds is a tide gauge - building - About this area live coral begins - stag horn and some smaller coral heads - all underwater at low tide - This area is perhaps 200 yds wide - At the edge of the reef is an area of coral plaques, breakdown etc..

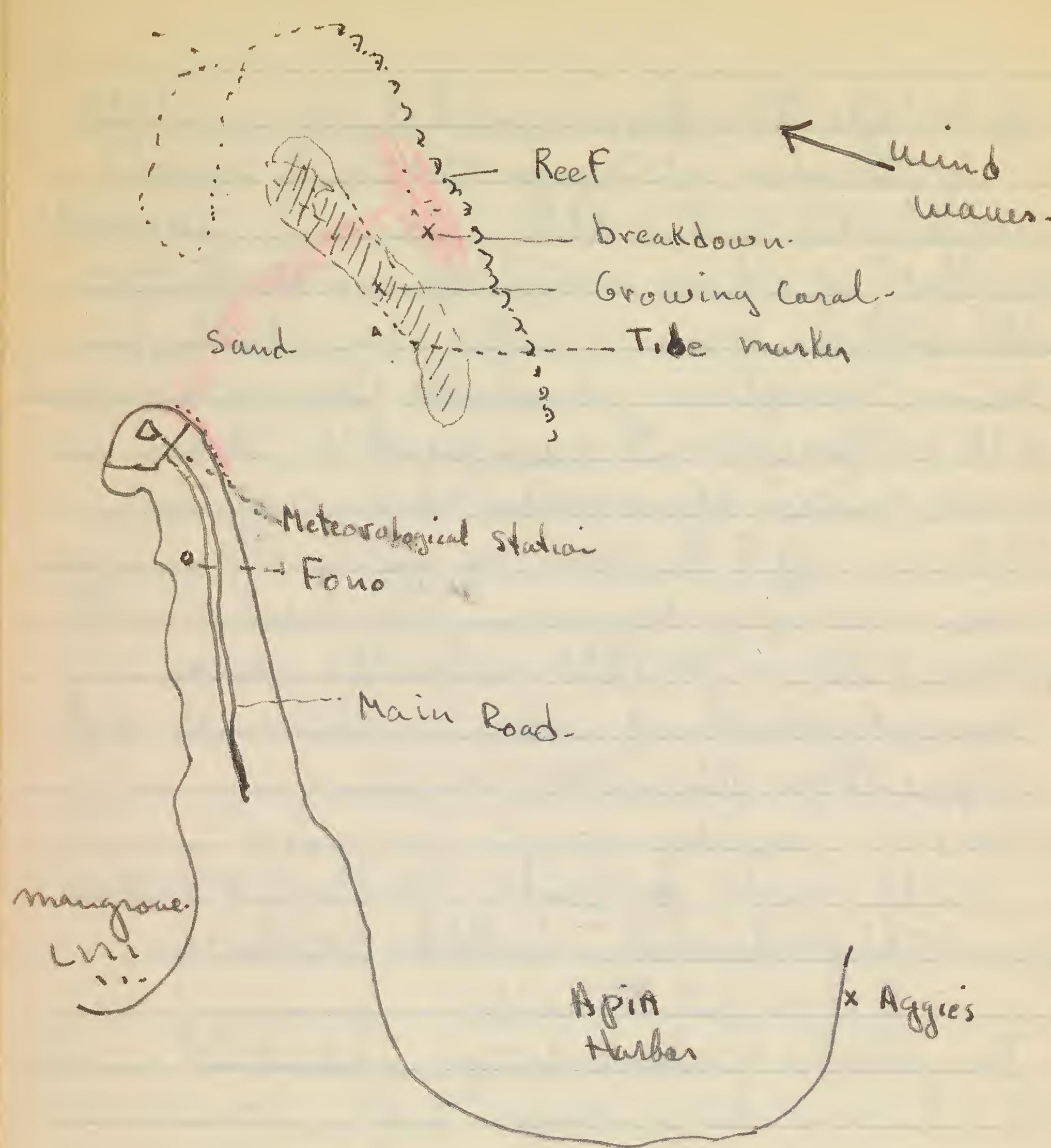
We set out at dark & reached the outer reef about sun up, Eddie, though a fisherman knew nothing whatever about shells or hunting them but spoke good English - The coral breakdown was searched for about 2 hrs. - Eddie found a $3\frac{1}{2}$ " *Strombus* - Several *Conus* - *Geographium*? - ^{Tulipus} Small *Cypraea* moneta & *Gammularis* - Some small murex - drupa - etc were found. Finally from the Paupau a slow search was made toward the point. - nothing was seen in the live coral - but as the sand came -

a single *Terebra crenulata* L. - shell was found - Suspected trails were investigated but nothing found - Several Callars of moon snail seen on the bottom - All old - none recent - no shells of moon snails - 3 shells *Conus Marmoreus*? all rather small - were found - Then an area where there were many *Pima* - At times up to 10 per Sq yd - This area was 100 yds across - Several small *strombidae* & *Bulla amphora* seen - Several shells of *Venericardium* - L. and a few other bivalves seen -

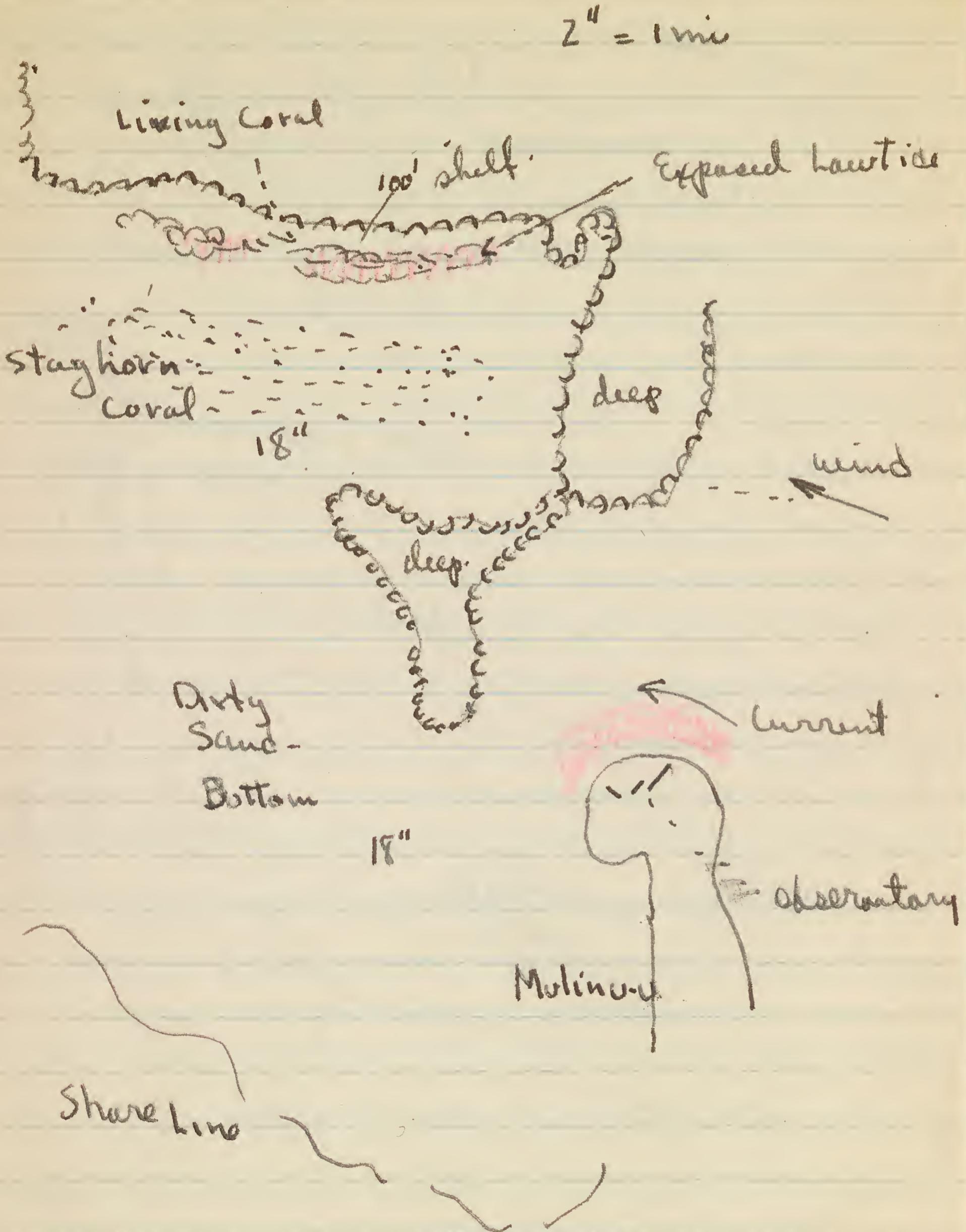
Shells were dried & mollescs preserved in Ethyl alcohol - labeled - area 14 -

Time - 4 hrs

Temp 76° - Water temp - about 80°



Area 15



North west Mulinu'u Point.

26th May - 69 - At 8⁰⁰ AM via papa to the reef about a mile beyond Mulinu'u Point - This was composed of a shelf of live coral 100' with a reef of heavy coral rocks for 100 ft - then coral breakdown + debris for 200+ ft followed by staghorn coral - The Low tide was 9.06 - Many *Cypraea reticulata* were found - also *Ceratostoma reticulatum* but only under the heavy coral - none under the coral breakdown or new coral - This area searched for 1½ - 2 hrs - both myself and Eddie Williams - By that time the water was returning so we drifted over the live coral, but surface was too rough to see -

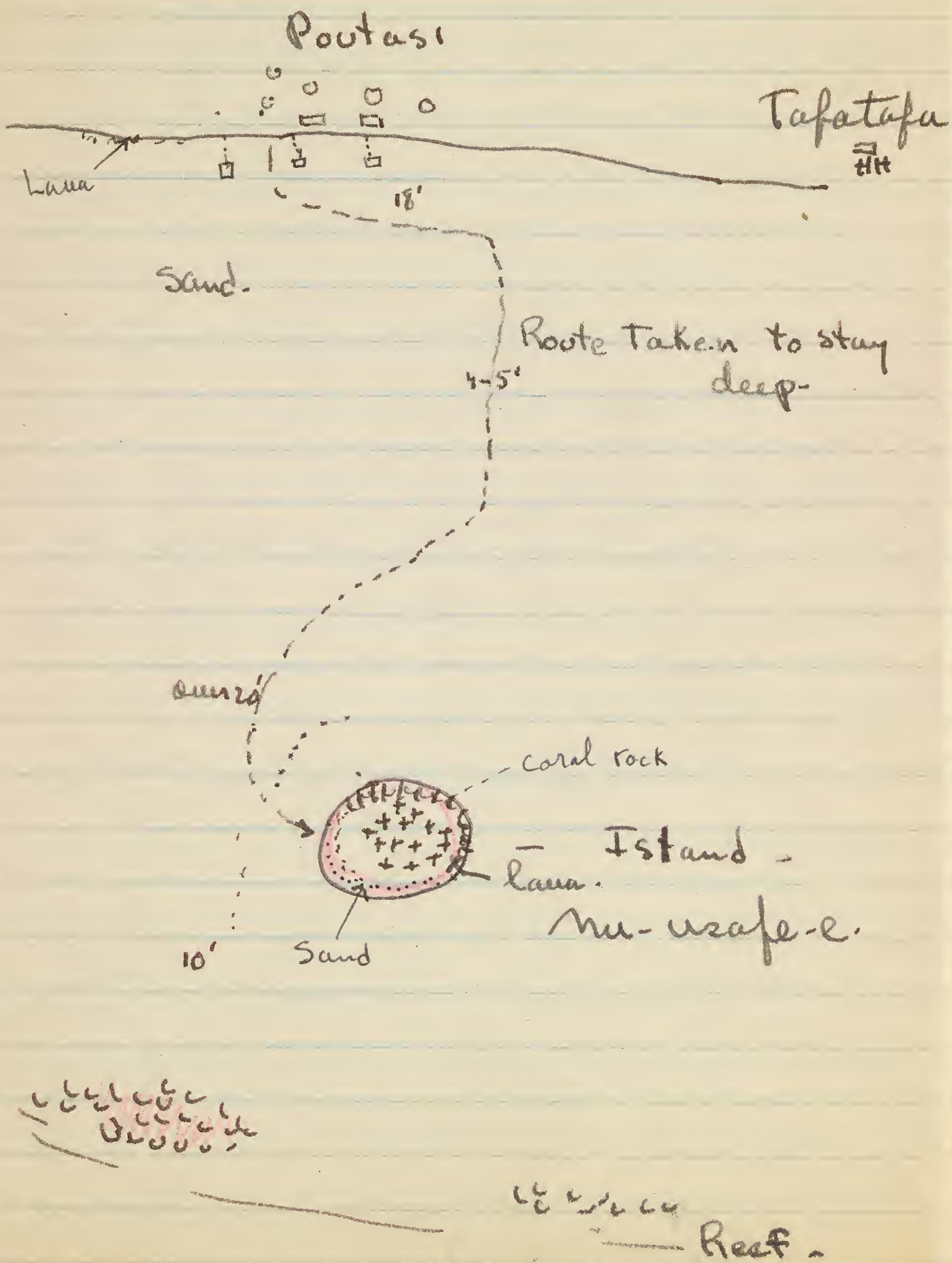
Finally an hr of snorkeling was done - gone to the East + drifting with the current - twice - near the shore the water is 8-10 ft deep - but out 200' it is 24" at low tide = 5' at high tide Bottom is undulating - calcareous dust - may star fish - pen shells - An occasional collar from a moon shell. Water was generally turbid = visibility under water maybe 100ft -

Area + b.

There were very few weeds -

Area 16

Mu-usafe-e Island.



On May 27 the village of Poutasi on the south shore of Upolu was visited and thru the village physician - Dr Fatu, arrangements were made to visit Mu-usafe-e Island.

Low tide on 28 May was 10⁴². AM. Poutasi shore line is lava rock & dirty sand devoid of shell remnants - 2 Paopao (outrigger canoe) fishermen took me thru a circuitous route which avoided shallows & coral to the island which is about $\frac{3}{4}$ mi. from shore - There is probably no way to wade to the island - the lagoon within the reef was in part very deep with large coral heads - in other parts it was sandy from 18" to 6' deeps - In the village Cypraea tigris were seen -

The island is coral with lava rock on the windward side - the leeward side was sandy - palm trees - big ^{almond} on the island.

The beach contained many shell fragments - ~~shells~~ One fairly good Cypraea tigris shore specimen was found. with a good variety of

Others including a Cypraea feline -
while the tide was low one of the
fishermen rowed me to the reef - It
looked old Coral placers with much
coral debris but no sand - no
algae - and very little mollusc life -
The fisherman found no ~~that~~ molluscs
but did find an Octopus - This area
was searched for $\frac{3}{4}$ hr -

The island was again reached and
then I walked around it - Very few
merita on the coral shores -- The shore
fell steeply on all sides with no
inshore protection for molluscs -
I had been told that turtles did not
nest on Samoan shores but I found
a discarded turtle nest = empty eggs -

Total time of search - $2\frac{1}{2}$ hrs -

The beach at Tafatafa was searched
but nothing found - (brief) -

Area 17.

Upolu - Samoa -
Nanua Island -

The road to Alepata district of Upolu is bad & resembles a Colorado mining road so that it took over 3 hrs to reach the town of Malaela.

This trip was made on 29 May with the help of Vincent Halleck, a Mormon missionary, also Samoan, who arranged for a fisherman to accompany me.

The reef at Alepata is about 3/4 mi from the shore and the east side of the small island of Nanua forms the edge of the reef. This island is a hill about $\frac{1}{4}$ mi across. The sea side is lava & part with no reef. In other areas there was a 100 ft growing reef but behind some lava rocks were some coral plaques under which a few molluscs were found. The rocks themselves had few clams - few nerita & few crab shells.

There was a 200 yd sandy beach on the outer edge of the island which contained abundant turban fragments, some weathered Cypraea Maculifera & Cypraea

caput serpentis. The lee side of the island contained very few shell fragments. One section was eroded coral with no molluscs - Conus ebraeus - not taken.

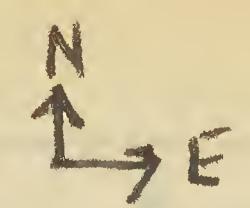
I was taken there by Pāi Schuenke a Samoan fisherman who apparently is a good fisherman but his knowledge of molluscs & shell fish was abysmal.

The lagoon between Nanua and the beach has some live coral but as nearly as I could see it was sand. Water was 4-6 ft at low tide. On the beach was a fragmented old Conus betulinus.

Collecting was done between 12 noon and 2 PM. Low tide was 11:30 AM. which we missed because we underestimated the roads.

Over.

Aleipata district



Fanusatpu
Island

Lagoon.

Sand
haua

Reef

Waves.

Opening in Reef

Area 18

Monono Island - Samoa -

This is a low coral + lava island to the west of Upolu - about 1 1/2 by 1 mi in size - It lies within a protecting reef which extends out from Upolu - and apparently has no high surf - The shore line is coral rock in part - much sand - and in the area we searched there were lava rocks - with white sand beaches between - each beach stretch being perhaps 100 yds in length -

There were numerous reedy plants off shore in water 18" to 5' and 100 yds off shore the water reached 10 ft - The bottom here was undulating sand + calcareous deposit so that when disturbed there was a huge cloud - ~~so~~ Star fish occasionally - Some holos, Thureus; an occasional large coral chunk - & much marine life but no growing coral -

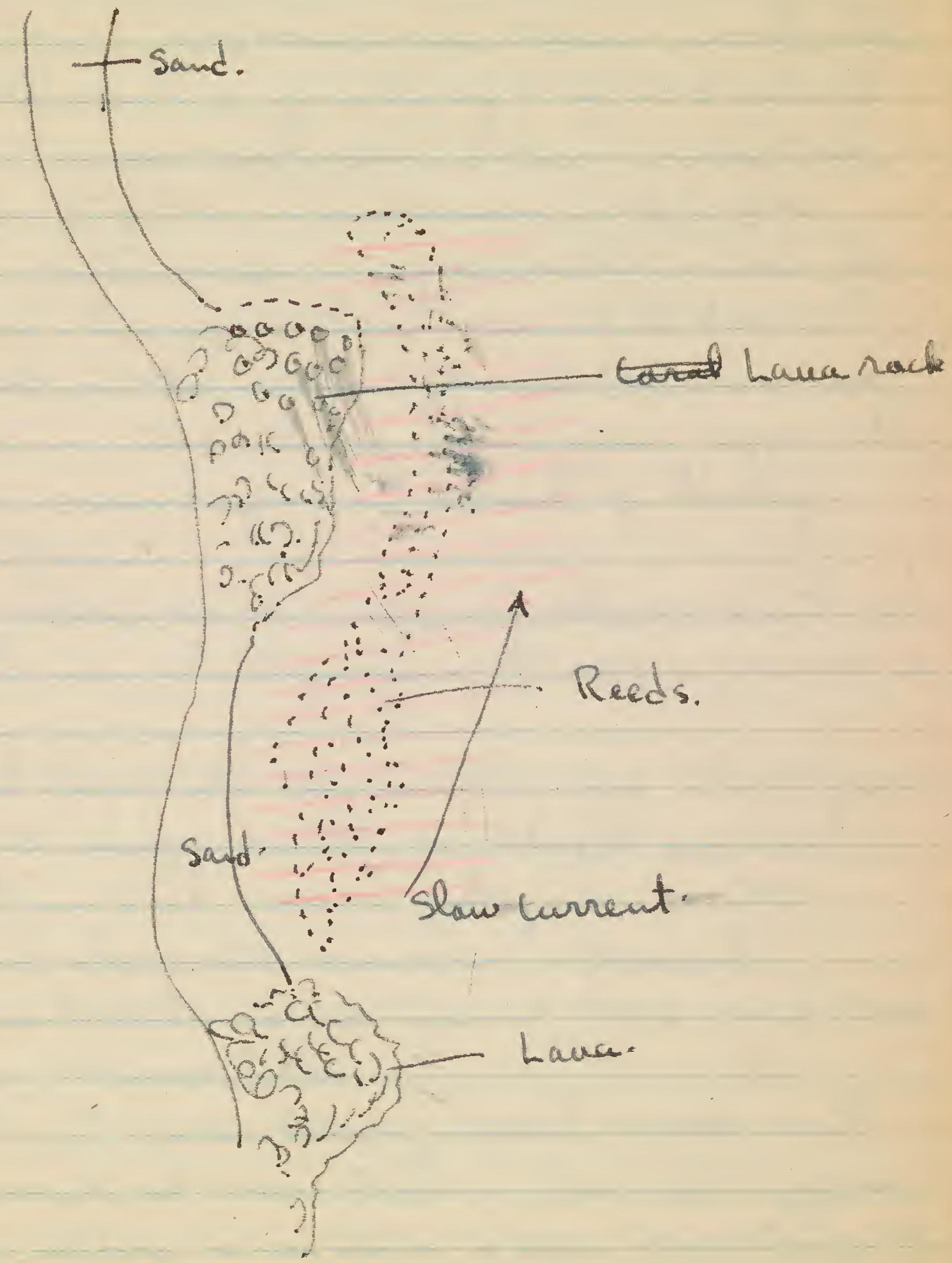
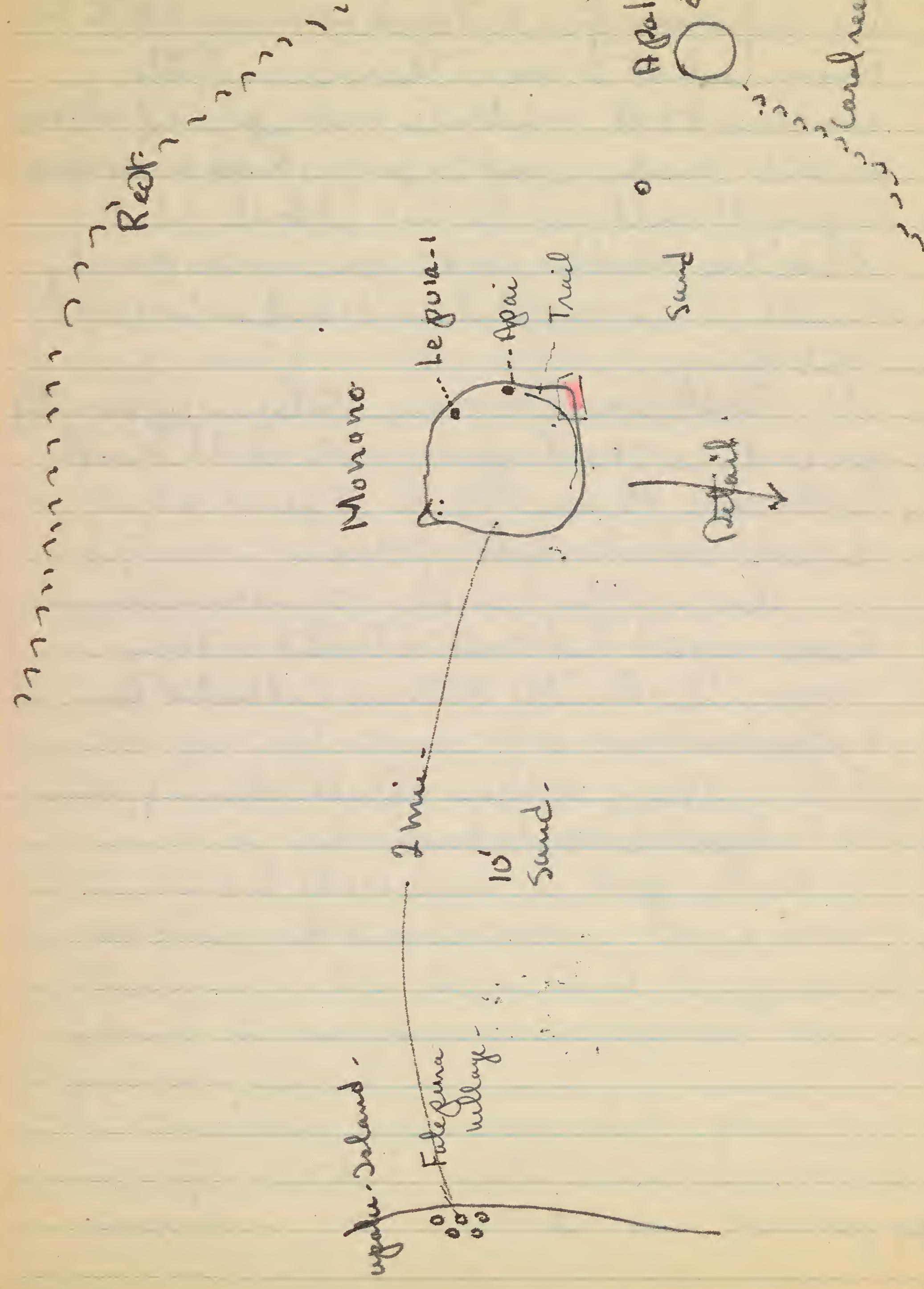
The area was searched over a 200 yd stretch with snorkel + shore search - at low tide - on 30 May 69

The reef was far out and inaccessible to me - From what I saw there was little evidence that molluscs were plentiful and I saw none except for a child who was trying to sell 2-5 inch black flat bivalve shells with an inner pearly luster - I couldn't find out where she got them -

Tatia, *Chromis tritoris* apparently present in the lagoon - A child tried to sell one to us - and I found a beach worn shell of one -

During the search numerous pimele were seen but not collected - They appeared similar to those collected in Upolu -

1 1/2 - 2 hrs - search during 6 hrs spent on the island



Area 19.

Western Samoa - upolu - Fagalu'i -

June 3. In this area there is a double reef and a party of 4 of us explored the inner reef for 2 hrs - low tide was at 3¹² - Search was 3 to 8:50 PM
The outer reef is approximately 1 mi off shore however there seemed to be a break in the reef opposite the area we were - The intervening lagoon apparently was very deep but devoid of heavy breakers -

There was a sandy shore but no shells or shell fragments were found on it.

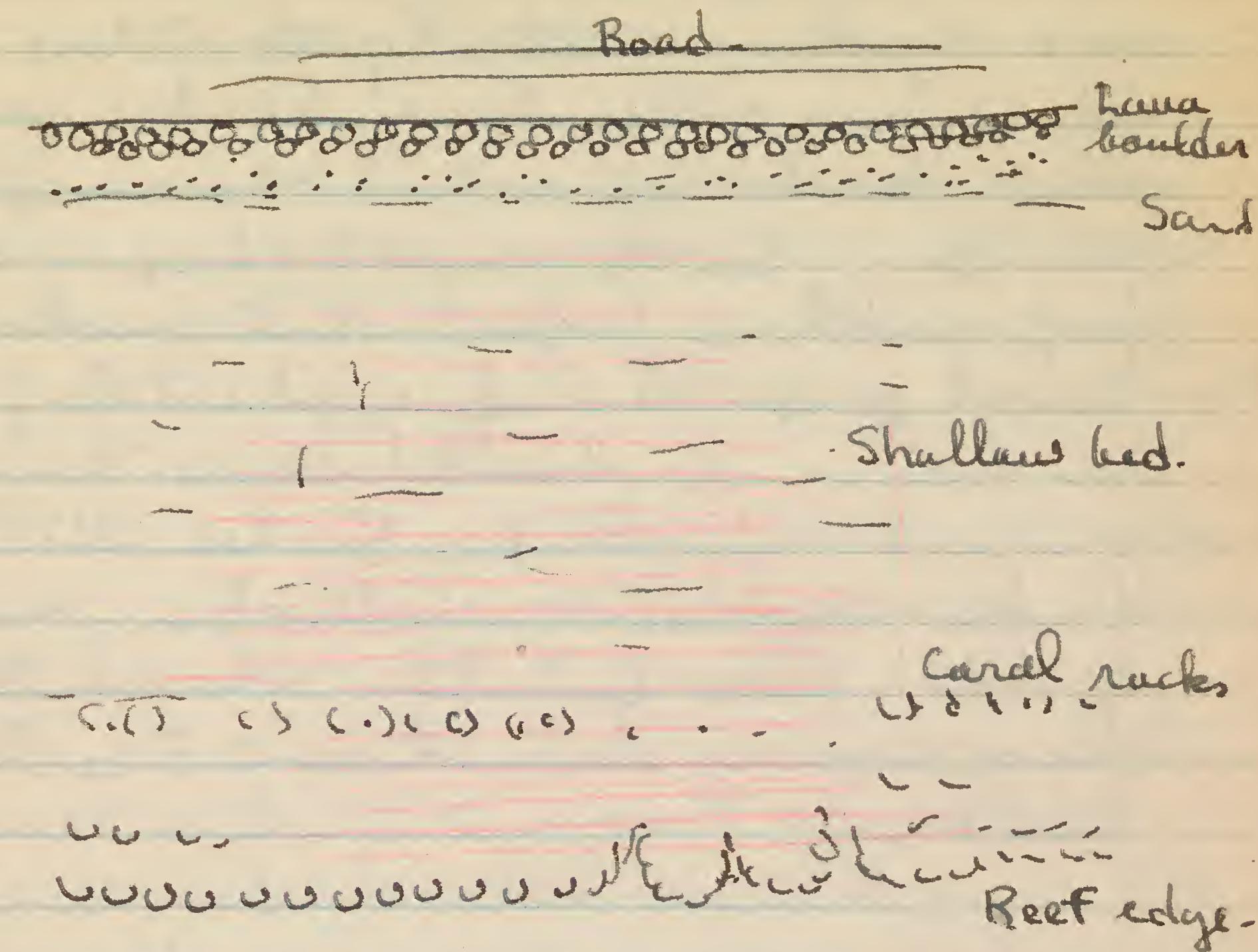
At low tide the water for 75 yds was 6"-12" deep with a slight current - Bottom had coral plaques - with sand beneath some - Several *Cornus textile* were found here and one *Cornus mustella* -

Next were heavy coral rocks not covered at low tide - Several *Cypraea maculifera* + *arabica* + one *Capulus serpens* found with several *C. erosa* - A few other frequently found specimens noted -

Then came the living reef which

was fully exposed to its edge - There was abundant live coral but no specimens but on Conus. (?) shells found

we crisscrossed over area of about 100 yds of beach front -



Area 20.

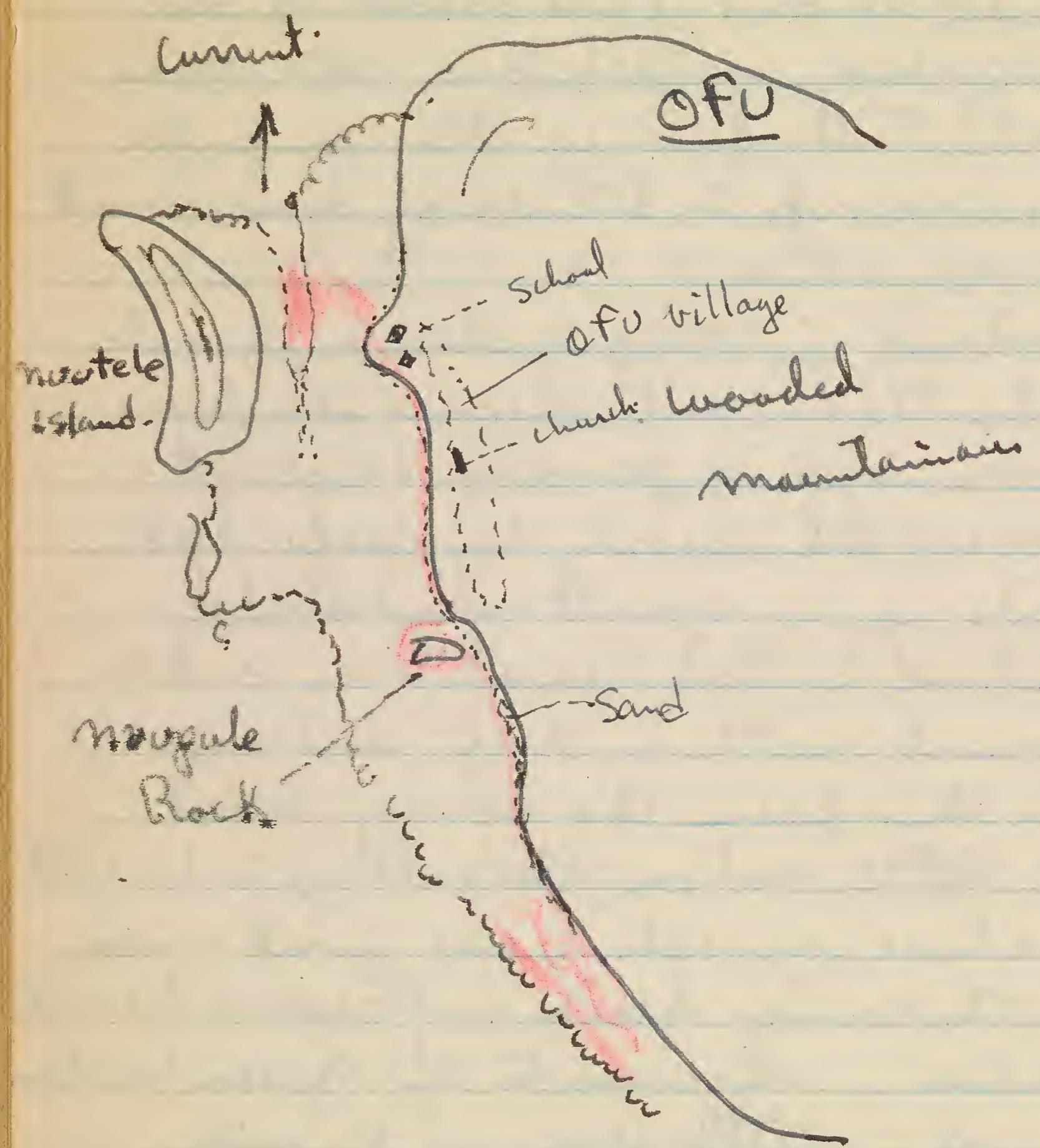
A tour of the island of Savaii was made -- virtually the entire island has either lava banks or sand beaches on which the surf pounds - On the north shore is a reef with a lagoon but made of travel prevented any exploration of this area - A limited shore search produced only broken turban shells, broken cyprae remants etc - None of these were collected - No shells were seen as decorations in the Fale visited -

Manua Islands - OFU -
14 June 1969.

This island is one of the lesser of the Manuan group - which lie 60 some miles from Tutuila - east - A 6 hr visit was made to OFU by government boat Manuina -

The island is triangular - 3 miles long - about 1½ miles across the base - It is volcanic i a peak of 1621 ft - It is surrounded closely by reef but on west side is a small uninhabited rocky island called Nuutile - a 300 yd channel with a deep center gorge separates this from the sandy west shore of OFU where the village is located.

A shore search was first made of the south sandy beach interspersed with lava piles - Remants of green turban shells found - little else - - Humpole rock circled at approaching low tide - finally headed to the edge of the reef over solid coral to the reef edge where there were old coral plaques - This area was searched for an hour and finally shore search was continued -



afternoon - a low tide - partially exposed coral rocks were explored out to the deep center - General C. maculifera found - One shell of Turbo petholatus - Using a Snorkel 3 of us - including the OFU school principal Mr Dan Kniff explored the deep center channel which was up to 30 yds wide + to 20 ft deep - Found no traces of shells or molluscs - Mr Kniff reported a remarkable dearth of shells about the island - I'm sure they may be present but our equipment did not include diving gear - to go over the reef edge - Snorkled for 1 hr -

many small specimen preserved in alcohol - no separation done -

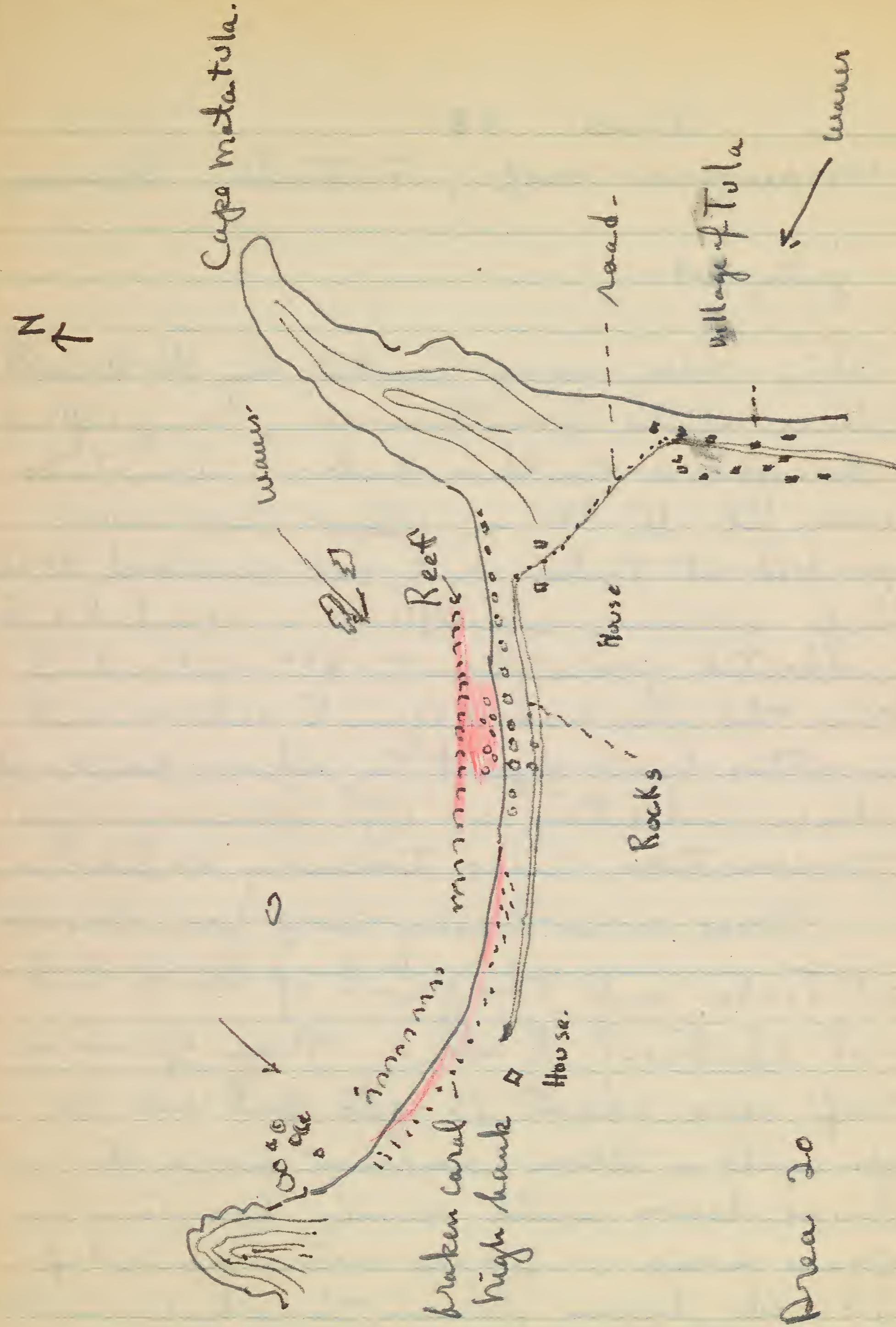
Area 24 -

Manapua reef, Tutuila. Samoa.

11 July 69

This area was visited by Dr Harold Rehder of the Smithsonian, myself and 3 daughters on this date - Low tide was at 11:33: - Our car was parked at Tula and we walked to the reef arriving about 11:30 - Waded and collected from then to 2° at which time the tide had begun to return and another hour spent in shore back and shore collecting - All specimens for preservation were taken by Dr Rehder.

. There was heavy surf from the SE at Tula and the point of land did not obstruct it all - This growing reef was about 75 yds out and 40 yds wide - Then came an area of breakdown with sandy covering in some areas. There were rocks of black lava lining the shore and in the shallow water - Water was very clear - Temperature 80° -



Area 20

Area 22

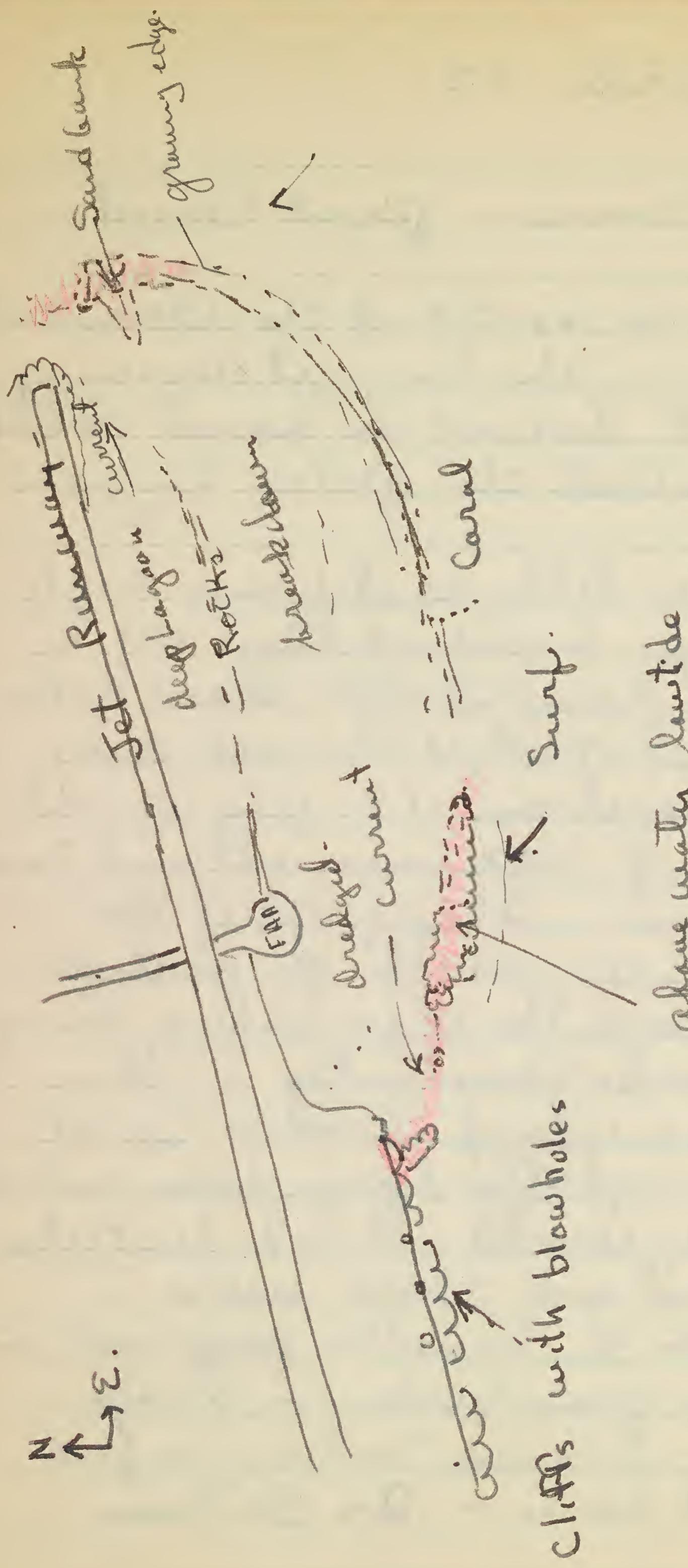
Tutuila, Samoa - Point Deceit -

This area is south of the international airport -- The long jet runway was built behind a coral reef which protects the Pala lagoon

It curves to the east from high lava cliffs in which there are a series of remarkable blow holes.

The first part of the reef only was explored on 19 July 69 and a number of specimens obtained, none unusual. — This part of the reef had a shelf of perhaps 100 ft from the edge where heavy surf breaks constantly. Then there is 100 yds of broken coral plates — mostly large ones — which are above water at .2 low tide.

At the west end there were numbers of *Lunella porphyria* — There were green turbans — *drupa* — *herites* : 2 cones miles, a few very small cones — An *Cirrula laurie* —



21 May Another search revealed more of the same -

23 Two of us attempted the reef at low tide however the surf was so high it washed over the entire reef - and Maria on the lee side was knocked over - so we retired without specimens.

27th July Low tide - it was found that by walking a mile to the edge of the runway - we could cross in 16" of water - three area of coral tuft - about 100' to the sand bank and on to the reef - The fauna was not unlike that seen on other reefs - One specimen of *C. helvola* was found. On the bank 2 empty shells of *testudinaria* found plus a 5" *Conus litteratus* - within the lagoon a 1' *tridacna* embedded in coral was seen - probably *gigas* - Specimens were put in alcohol -

28th Same reef visited - specimens not unlike that found before -

29 July. The west end of the reef was visited at low tide - 1-3 PM - by 3 of us - a search of the lagoon on the upper end revealed a bottom of broken coral - An occasional *Rimula* was seen. Some *C. annulus* - & *C. moneta* - with small shells & crabs -

.2

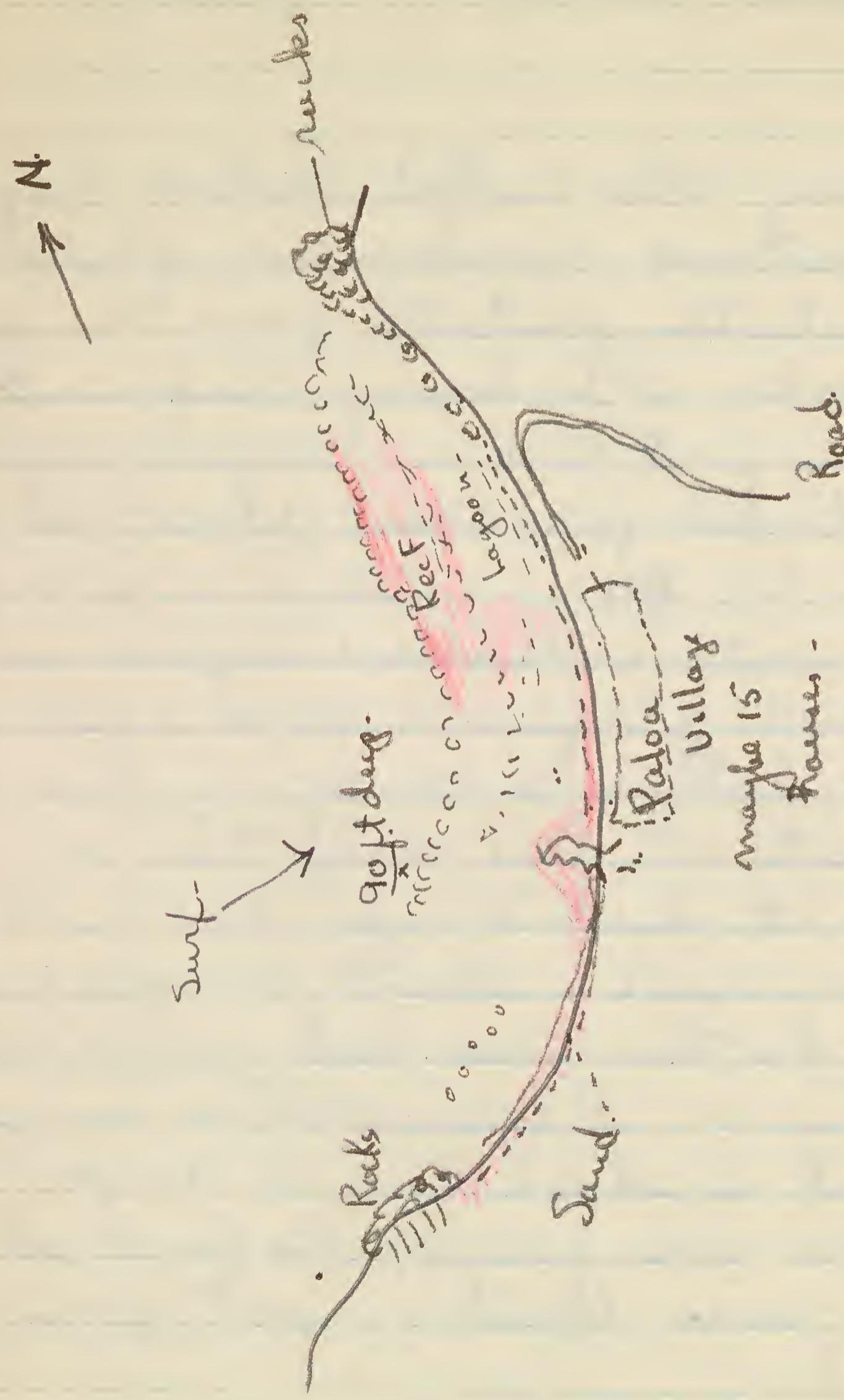
21 Aug - Calm - low - morning tide however the swells were still breaking at 10 and 12 ft releasing such a surge that only the most limited search could be made - On one point of the beach - shore shells of *Cyprea testudinaria* and *Argus* are consistently found however the live animals can't be found -

Area 23

Tutuila Samoa - Paloa -

Paloa bay also called Hubner Bay is on the extreme western end of Tutuila. It is partially protected from the South east trades & the heavy surf - It was visited for first time on 26 July - and 4 of us collected for about 2 hrs - at low tide - 11 - 1 PM - There is a sandy beach - with a shallow lagoon - with some coral plaques & some rocks - but generally bottom is sandy - This had 6' of water at low neap tide - beginning at about 70 yds was a reef of growing coral - about 50 yds wide - It was in this area that major collecting was done - Representative samples were put in alcohol - A single *C. mauritius* was found, the first collected by me since April - not preserved in alcohol -

A shore search was also done - One large broken shell - probably *C. tritonis* seen - plus the usual assortment of *Conus*, *Cypraea* - etc -



From 26 July - to 18 Aug the wind was constantly high with surf of 6' or over at all times - Several attempts made to reach this area but reef always under 1 ft of water or more - a search by 3 people from 3 PM to 6 PM on 18 Aug 69 revealed only a limited assortment of specimens other than very many *Cypraea annulus*.

